TAMPA BAY WATER

Supplying Water To The Region

COMPILATION OF MEMBERS' FIVE YEAR CONSERVATION PLANS

DECEMBER 30th, 2015

HILLSBOROUGH COUNTY | PASCO COUNTY | PINELLAS COUNTY
CITY OF NEW PORT RICHEY | CITY OF ST. PETERSBURG | CITY OF TAMPA

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Background

Tampa Bay Water is Florida's largest wholesale water provider and supplies potable water to over 2.4 million residents in the Hillsborough-Pasco-Pinellas tri-county area. The agency provides water to six member government utilities, including the three counties mentioned above and the cities of Tampa, St. Petersburg, and New Port Richey. Although conservation efforts began in the late 1980's by its predecessor agency, the focus of this report is to provide post Tampa Bay Water creation contributions to conservation.

As a part of its existing water conservation planning and coordination role, the agency, with input of its member governments, developed a series of water conservation best management practices (BMPs) for reducing interior and exterior potable water demand over a specific planning period and a water savings tool allowing members to compile and evaluate various projects and scenarios for implementation, review, and documentation of implemented measures. This was done after completion of the predecessor Agency's original demand management plan (DMP) in 1998.

In mid-1998, the Northern Tampa Bay New Water Supply and Groundwater Reduction Agreement (Partnership Agreement) was incorporated among Tampa Bay Water, its member governments and the Southwest Florida Water Management District (District). The Partnership Agreement also required Tampa Bay Water and its member governments to continue to plan, coordinate, develop, construct and implement conservation and reclaimed water projects in accordance with the responsibilities assigned to them.

Annually submitted and regionally compiled five-year water conservation plans were required to quantify active conservation and demand management programming and for consistency with Tampa Bay Water's Master Water Plan. The Master Water Plan conservation goals, developed in 1995, included an aggressive demand management/conservation component with goals to reduce overall regional potable water demand at least 17 mgd in 2005, at least 21 mgd by 2010, and 26 mgd by 2015. These goals were adopted into the Partnership Agreement by reference. Partnership specific planning and evaluation elements were completed in 2008. The annual compiled conservation plan was also used to comply with

water use permits and required conservation reporting and, currently to determine consistency with existing agency goals.

At its December 2008 Board meeting, the Tampa Bay Water Board of Directors approved Resolution No. 2009-004, directing the agency to prepare a revised DMP. After completion of plan components, the Board of Directors, in February 2013, approved Resolution No. 2013-006 incorporating water use efficiency evaluation into the Agency's long-term water supply planning process. This resolution directed the Agency to:

- Develop and implement data collection, management and analysis protocols and procedures for the continued assessment of passive water use efficiency within Tampa Bay Water's service area.
- Integrate passive water-use efficiency into the Agency's Long-term Demand Forecast and Future Need Analysis.
- Include the Water Use Efficiency Evaluation as an element of the Long-term Water Supply Plan and include an updated evaluation of potential active measures for implementing efficient water-use products as part of future options for the next Long-term Water Supply Plan update.

This DMP consists of a comprehensive investigation of benefits-costs of integrated water demand management as a quantifiable alternative to conventional water supply sources, reflecting improvements in the state of water use efficiency occurring since 1998 when the first DMP was adopted with information provided in Appendix A. The update includes an evaluation of potential demand management projects as a beneficial tool for long-term water supply planning. Results define how water efficiency activities may fit into Tampa Bay Water's long-term water supply planning process, which includes supply reliability and member government long range demand projections. The demand management evaluation effort includes an analysis of water savings (past and future) and an analysis of avoided supply costs related to improved water use efficiency.

The DMP's "avoided supply cost" analysis considered increments of conserved water versus (a) cost to operate existing water supply sources and (b) total cost (capital and operating costs) to develop new water supply. (Since there were no new supplies identified as <u>needed</u> in 2013 Long-term Water Supply Plan, avoided supply costs were applied to increasing use of seawater desalination facilities.) Consideration of cost savings and water supply benefits permits a consistent "apples to apples" comparison to other water supply alternatives. Conserved water programs/BMP savings rates were quantified in this document through either direct evaluation of billing data, implementation data collected by member governments, or through other sources of independent efficiency potential.

In addition to resolution 2013-006, the Board of Directors at its August 18, 2014 meeting reiterated and directed staff to evaluate active conservation potential and integrate it into the long-term demand forecast model redevelopment process as part of the 2018 Long-Term Water Supply Update. This evaluation is beginning in water year 2016.

The annual update developed herein provides one tool to track efficiency program implementation. Collection of actual implementation data from member governments is ongoing and will be used to update actual savings rates and future DMP program potential.

Best Management Practices (BMPs)/Water Savings Calculator Use

A series of generally acceptable and quantifiable potable water conserving BMPs are used and classified with respect to default water savings rates, implementation costs and interactions with other BMPs. These BMPs were updated, modified and some removed after evaluation of savings, or lack thereof, occurred within the DMP. They are generally applied to existing or new water uses and can affect water use through modification of existing technologies.

BMPs used for evaluation and implementation are provided in Table A. Although, in some locations, ultra-low flow toilet (ULFT) rebates continue in the region without prescreening based on relative efficiency, most programs are now focusing on use of only high efficiency (1.28 gallons/flush) toilets meeting stringent EPA WaterSense testing requirements. This minimizes the potential for program free riders (users that would purchase the device with or without the incentive) or at least require an added level of efficiency. The Southwest Florida Water Management District's cooperative funding program, provides funding only for applicable WaterSense products.

A Water Savings Calculator (WSC) program is used by Tampa Bay Water and its member governments in developing annual active water conservation implementation plans using pre-defined and customizable BMP templates. The WSC is a comprehensive, tool having few inputs, requires minimal training and generates required electronic and paper reports as needed by Tampa Bay Water and member government water conservation coordinators. The WSC saves BMP scenarios and subdivides them into categories and sectors. A scenario refers to simulated implementation of a BMP, for a category and water use sector, using relevant information such as the life of the BMP, water savings rate and cost per measure. All BMP's implemented by member governments are provided in Appendix E.

Table A: Best Management Practices Implementation in Tampa Bay region

BMP	Category	Sector	Default Savings Rate	Units
Non-Potable Irrigation Source Replacement or Rebates	(1) Reclaimed Water	SF	**258**	Gpad
	(2) Groundwater from a Shallow Well	**MF**	**Variable[2]**	Gpad
	(3) Other Irrigation Sources	**NR**	**Variable[2]**	Gpad
Water-Efficient Landscape and Irrigation Evaluations and Rebates	(1) Landscape & Irrigation Evaluations w/o Rebates[3]	SF	81	Gpad
	(2) Landscape & Irrigation Evaluations w/ Irrigation Rebates	**MF**	**Variable[4]**	Gpad
	(3) Landscape & Irrigation Evaluations w/ Irrigation & Landscape Rebates	**NR**	**Variable[4]**	Gpad
High-Efficiency Clothes Washer Retrofits	(1) Coin-operated Self-serve Laundries (19 units)	NR	n/a	Gpad
	(2) Common Area Washers (affects all units)	MF_{com}	3.7	Gpud
	(3) In Unit Washers (affects rebated units only)	MF_{in}	12	Gpud
	(4) SF Homes	SF	15	Gpad
Ultra Low Flush (ULF) Toilet Retrofits	No Categories	SF	27	Gpad
		MF	20	Gpud
		NR	49	Gpmd
High Efficiency Toilets (HET's)	No Categories	SF	32	Gpad
		MF	22	Gpud
		NR	35	Gpmd
Urinal Rebates	ULF Urinal	NR	51	Gpad
Industrial, Commercial and Institutional Water-Use Evaluations/ Implementation	(1) w/Rebates	NR	Based on end use data	Gpad
	(2) w/o Rebates			
Pre-rinse Spray Valve	No Categories	NR	103	Gpmd
BMP Template	(1) Indoor	SF MF NR	Based on end use data	Based on end use data
	(2) Outdoor			

SF = single- family residential
MF = multi-family residential
NR = non-residential
MFin = multi-family residential with in-unit laundry room
MF_{com} = multi-family residential with a common laundry area
gpad = gallons per account per day
gpud = gallons per unit per day
gpmd = gallons per measure per day

1. *Default rate is approximate based on sq. ft of landscape and irrigation frequency annually.*
2. *Savings rates are not well defined. Site specific data required!*
3. *Savings not assured without follow-up or rebates.*
4. *Savings rates are not well defined. Site specific data required!*
5. *Recent research indicates savings rates can vary based on quality of fixture.*

A plan is defined as a collection of scenarios which provides a higher-level of certainty in terms of potable water conservation savings estimates. Tampa Bay Water's plan is the compilation of the member government's six individual active plans.

Greenhouse Gas Calculations and Reduction Methodology

In early 2007 Tampa Bay Water developed a methodology to calculate greenhouse gas emissions directly associated with energy use in water production. This methodology provides a relationship between reduced potable water demand (conserved water), reduced electrical use by Tampa Bay Water and how these result in reductions in greenhouse gas emissions associated with saved water. This methodology was updated in 2009, 2013, and 2014 to include greenhouse gas emission reductions from change-out of hot water using appliances and technologies, in the residential and commercial sectors(2013) and changes to data collection and distribution methods (2014). Furthermore, the data was updated in 2015 with 2015 Air Markets Program and 2012 eGrid data, both from the EPA. Staff has been evaluating the potential for selling carbon credits in the future to offset some conservation implementation costs. The Greenhouse Gas Emissions Associated with Water Production Methodology report can be found in Appendix F.

BMP Cost Effectiveness and Savings Potential

Through redevelopment and approval of the updated DMP, Tampa Bay Water has identified various programs and BMPs that are generally not effective at reducing demand. In addition, many cost-effective and positive avoided cost programs/BMPs have not been implemented and/or saturation rates have not been met. Therefore, significant savings potential exists. The DMP determined an additional 12.31 mgd could be saved through active conservation programs, through programs meeting the screening criteria, by 2035. Table B provides specific information on programs that meet existing regional avoided cost objectives. Member government objectives may differ, so some programs not identified as meeting regional avoided cost benefits may meet their saving and cost requirements. Additionally, just using cost effectiveness does not take into account fixed utility costs nor do they account for passive market penetration changes.

Table B. Regional Programs meeting Cost Objectives (2013)

Activity Name	Sector	Utility Costs ($/unit)	Savings, Useful Life (yrs)	Unit Savings, (gpy)	Gallons Saved Over Useful Life	$/1000 gal
Cooling Tower	NR	$1,000	10	1,386,530	13,865,300	$0.07
PRSV	NR	$30	10	37,426	374,260	$0.08
HEU (1/2 Gallon)	NR	$125	30	18,928	567,853	$0.22
ULFT (Valve-Type)	NR	$125	30	17,970	539,100	$0.23
Alternative Irrigation Source	SF	$750	25	94,034	2,350,850	$0.32
HET (Tank-Type)	NR	$125	30	12,843	385,290	$0.32
Residential HET	SF	$100	25	11,542	288,550	$0.35
ET/SMS Irrigation Controller	SF	$200	10	56,645	566,450	$0.35
Residential HET	MF	$75	25	8,111	202,775	$0.37
Conveyor Dishwasher	NR	$500	20	59,951	1,199,020	$0.42

Table C provides a listing of BMP implementation status (existing or historical) and relative cost effectiveness. Cost effectiveness is an evaluation of the dollar savings efficiency programs incur over a products water using lifetime versus cost of water in dollars/1000 gallons. Incentive programs requiring hardware changes only, without habit modification and with verified research, provide the most reliable documented savings. Indoor water conservation BMPs with well-defined default savings rates, consistent standards of technology, and detailed implementation strategies generally affect water use across sectors consistently throughout the year. Outdoor BMP savings rates are more difficult to quantify since there needs to be focus on surplus irrigators (those that use more than the theoretical water requirements of the landscape) in the single family sector and irrigation use can change based on weather conditions, user preference and other external factors. Single family irrigation use estimates are provided in the DMP, but multi-family and non-residential use data is on a case by case basis. Previous best management practice documents developed by Tampa Bay Water are generally not applicable and should not be used as new defaults supercede those documents.

Research and evaluation on use of automatic rain shut-off sensors (considered increased automation in survey results identified and evaluated in the DMP) indicate the potential for increased water use (opposite of what might be expected) or at least the lack of reduced water use. This increased automation might be a component of irrigation controller setting changes as well (the system remains

pre-set and on to specific days per week). Additionally, recent research conducted by the University of Florida on irrigation systems in the region and other parts of the state indicate rain sensor devices don't result in significant water savings in actual field conditions, whereas even in research conditions savings deteriorate over time (within one year) unless periodic maintenance is performed. This report includes some member proposed rain shut-off programming but verified savings have not been provided.

Existing reclaimed water program costs are based on individual project costs, member government estimates of infill costs, projections where connections may have been deactivated, and vary by location. Default potable water savings rates were modified consistent with evaluations conducted for the DMP, although member governments may provide alternative justifications for differing savings rates. Additionally a tool in the WSC allows members to track individual reclaimed project costs and savings, while aggregating them into one scenario per sector of water use. The averages from more than one project per sector of water use is averaged and that savings rate is applied to all active connections in the scenario, including historical accounts. This can change historical saving rates and overall saving estimates. Multi-family and non-residential savings estimates could be affected by these changes. Since members provide Tampa Bay Water with billing data and reclaimed water account information is provided in that data, actual reclaimed water account data is used for account total comparison.

Although reclaimed water used for irrigation is a very popular potable water conservation tool, initial capital outlays can be high, estimates of savings are variable, particularly for multi-family and non-residential settings where irrigable areas are highly variable, and new connections may be water demand that may not have occurred without reclaimed water availability. Members reclaimed water project costs are lowered when programs require new or existing development pay for and place distribution lines during construction.

Table C. BMP Implementation Status/Cost Effectiveness (CE)

BMP	Category	# Members Implementing	General Range of Cost Effectiveness ($/1000 gallons saved)	Comments
Non-Potable Irrigation Source Replacement or Rebates*	(1) Reclaimed Water	6	0.50-6.48	Well established in SF sector. Most cost effective implementation/offset in non-residential
	(2) Groundwater from a Shallow Well	1	<0.50	Can be implemented where appropriate.
	(3) Other Irrigation Sources	1	<0.50	Includes cisterns, surface water, and any type of non-potable source.
Water-Efficient Landscape and Irrigation Evaluations and Rebates*	(1) Landscape & Irrigation Evaluations w/o Rebates	2	0.40-2.61	Evaluation programs well established in parts of region. Savings not assured or well quantified, particularly MF and NR sectors.
	(2) Landscape & Irrigation Evaluations w/ Irrigation Rebates	2	0.50-2.50	Savings assured. CE variable due to user size of irrigation system rebated and cost/rebate.
	(3) Landscape & Irrigation Evaluations w/ Irrigation & Landscape Rebates	0	0.50-2.50	Savings assured. CE variable due to size of landscape/irrigation system rebated and cost/rebate.
High-Efficiency Clothes Washer Replacement	(1) Coin-operated Self-serve Laundries (based on 19 units)	0	0.25-0.75	High savings potential. Laundries with high turns/washer lowest CE.
	(2) Common Area Washers (affects all units)	0	0.50-1.00	Opportunity to work with apartment or common area laundry association.
	(3) In Unit Washers (affects rebated units only)	0	>1.50	Enhanced with energy rebates.
	(4) SF Homes	0	>1.50	Enhanced with energy rebates.
Ultra Low Flush (ULF) Toilet Replacement	No Categories	4	0.50-0.72	Well established in SF. Most cost effective implementation in non-residential
High Efficiency Toilet (HET) Replacement	No Categories	3	0.50-0.93	Enhancing ULF replacement to this standard would increase water savings by 20%. Implemented in other parts of country and state.
Pre-rinse Spray Valve	No Categories	3	<0.50	Well Established in NR. Most cost effective implementation in NR.
Urinal Replacement	(1) High Efficiency Urinal	0	<0.50	Potential for both types of urinal replacement programs. Can be combined with ICI rebates.
Industrial, Commercial and Institutional Water-Use Evaluations/ Implementation	(1) w/Rebates	1	0.50-1.00	Providing rebates secures potential savings. Performance contractor can be used by end user to augment funds.
	(2) w/o Rebates	2	<0.50	Can be cost effective with good program management/follow-up, but savings are not insured without incentive or private performance contract.

* All outdoor irrigation modification or source replacement programs generally require existing irrigation to be from a potable source. Savings rates for multi-family and non-residential sector vary significantly from default savings values due to irrigated area differences.

Compilation of Member Five-Year Conservation Plans

Consistent with Tampa Bay Water Board Resolution 2013-006, annual collection of data associated with member government active implementation programs is required to evaluate remaining passive conservation in the system and to evaluate active conservation potential during periodic updates to the DMP. Quantification of active conservation measures being proposed for implementation over the next five years and those actually implemented historically are used (cost effectiveness is estimated for the upcoming 5-year period only).

Members generate savings estimates through the use of the WSC or their own savings per program, wherever possible. The overall water savings (exterior and interior) estimates for members, based on their proposed 5-year implementation plans, are presented in Appendix B. Combined water savings from programs affecting the exterior water use for all members are presented in Appendix C. A similar compilation of combined water savings from programs affecting the interior water use is presented in Appendix D. Implementation of specific BMPs by all member governments is summarized in Appendix E Tables 4-25. A key to the table structure is presented in the Key to Table Structure section. A review of applicable research can be found in Tampa Bay Water's DMP (http://www.tampabaywater.org/documents/conservation/2013_TampaBayWater-Water-Demand-Management-Plan.pdf) and in the DMP's Executive Summary which is found in Appendix A.

Education and Public Awareness Five-Year Programs

Education programs have been developed and implemented successfully by Tampa Bay Water (funding only), many members and the Southwest Florida Water Management District historically. Education programs are generally targeted toward specific age groups and/or sectors of the population. Some education programs are offered on an annual basis and are designed to educate the public on the need to conserve water and a means to modify future water use habits. In-school education programs have developed curriculum materials and are approved for use by the public school system. Generally, these programs offer specific curricula, a mechanism to measure knowledge, increase and change in water use habits.

The Florida Friendly Landscape program, implemented through county extension offices, is an example of a horticulture education and recognition program with some pre and post data that has been evaluated in Tampa Bay Water's DMP, with good results. Tampa Bay Water continues to fund this program

throughout the region and expanded the program in 2014 with a focus on quantifiable water use efficiency changes.

Public awareness programs also provide education to the public but are generally not quantifiable in nature. They reach a broad population base and are developed to keep issues in front of the public. No predefined curriculum is generally developed and mechanisms to measure their effectiveness are much broader and non-quantifiable than education programs. These programs promote conservation and can include specific BMPs that may be implemented by the public. Program specific costs should be included in the BMP being promoted.

Educational and public awareness programs and descriptions of member' specific conservation program implementation strategies, as provided by member governments and Tampa Bay Water, are attached in Appendix G. Educational programs are not included in the 5-year savings worksheets because water savings are neither defined nor quantifiable. However, these non-quantifiable member programs continue to be integral and are necessary to stimulate interest and awareness of conservation programs by the public.

A Key to the Table Structure

As described, a summary of estimated water savings and the associated costs for implemented BMPs are presented in Appendix E. Each table is similar in its structure and contains the "Cost", "Annual Savings, MGD" and "Cumulative Water Savings, MGD" for each member government. The tables are subdivided by water use sectors (single family, multi-family and non-residential) to further disaggregate demand management programming. Estimated regional water savings (per year and cumulative savings) and costs for each year are presented at the bottom of each table. "Scenario Cost Effectiveness" is associated with the 2016-2020 5-year plans and does not include historical activity and 2015 data. Number of measures reflect all rebates/unit, evaluations and reclaimed water connections and are associated with member government' wholesale and retail water service areas. Reclaimed water customer connections are comprised of active accounts only. Therefore actual account data can differ from gross number of connections made by a utility to a customer location. Additionally, reclaimed water project savings rate occurring in one year are currently combined and averaged and are used for both historical calculations of savings and projections. Tampa Bay Water staff have weighted existing savings rates with historical where both are known.

Values presented in each table have been divided into three main categories; "Historical Activity," "Current Year" and the "5-year plan." Historical activity includes the cost and water savings up through WY-14. The Current Year Column is identified as 2015 since these numbers approximate totals from that year (reports were designed to be completed at end of the water year). All costs and savings prior to 1996 are summarized under the column heading "Pre-1996" programs in Appendix E. This was necessary since 1995 was considered the base year (Master Water Plan conservation goals adopted in December 1995) and water savings from programs implemented prior to 1996 would be included in the actual water use data for 1995. Therefore the cumulative water savings include savings from WY96-2020.

Appendix B represents the estimated combined potable water savings of all Tampa Bay Water members. Savings are broken down by member and by year in the five year plan. Program costs were provided based upon estimates from member governments and should reflect total government program costs for the five year plan. Cumulative estimated regional savings are provided for both pre-1996 programs and from WY-96 forward. For example, at the end of WY 2020 approximately 28.30 million gallons per day (mgd) would be saved if all programs identified are funded, implemented, they actually offset anticipated potable demand and the savings rates identified are met throughout the program life.

Summary

According to member government actual and projected 5-year water conservation plans, it is estimated the region cumulatively saved approximately 24.69 mgd of potable water by the end of WY 2015 and will save up to a total of 28.30 mgd of potable water by the end of FY 2020. Both are about 2 mgd lower than the previous year projection due to more accurate water saving rates for a number of reclaimed water scenarios and refined program penetration rates. The projections assume that savings rates and quantity of changes proposed are achieved for all BMPs throughout the program life. The default savings values developed in the WSC are based on either results from the 2013 Demand Management Plan (DMP) or other generally applicable research results in most cases. Default savings rates were modified in 2014 to more accurately reflect the results associated with analysis in the DMP. Where default savings rates were not established, member government specific information is required. Additionally, variability in actual and estimated accounting reflects significant differences in estimated savings rates for some members from year to year.

Potable water savings resulting from reclaimed water use account for approximately 17.43 mgd of the 24.69 mgd potable water that was projected saved through 2015. Reclaimed water use offsets are accounted for in Tampa Bay Water's long-term demand forecast model, as are historically implemented

BMP's. Using targeted number of new reclaimed water connections can provide an empirical method to verify and validate potable savings assumed by members.

Greenhouse gas reductions were calculated based on the methodology developed by Tampa Bay Water. Calculations are based on actual water production from Tampa Bay Water facilities. Since facility operation may vary from year to year and 2007 was the first year of calculation, the baseline is considered 2007 and future estimates were not calculated due to potential changes in source water production and changes in production efficiency. Non-potable alternative water supply-related potable water conservation offsets (i.e. reclaimed water, shallow wells) require electricity to operate and are not evaluated in this methodology, but could be evaluated by member governments. Regional water conservation related carbon dioxide equivalents were calculated for nitrous oxide 310 times more powerful than CO2) and methane (21 times more powerful than CO2) in the following calculations. In 2015, carbon dioxide equivalent reductions, based on 2012 eGrid data emissions data, were estimated to be 20,620 tons. In 2009, the greenhouse gas reduction methodology was expanded to include hot water conserving technology for mostly residential water uses, but included commercial pre-rinse spray valve technology. Between 2007 and 2015 it is estimated that potable water conservation programs in the region reduced carbon dioxide equivalent emissions by 164,960 tons. This is equivalent to 34,400 cars emissions reduced over an 8 year period (about 4,300 cars emissions reduced for one year).

Pinellas County's plan does not include wholesale and retail potable customers that have their own self supplied reclaimed water system (Pinellas Park, Tarpon Springs and Largo) nor the design and construction cost for customers receiving Pinellas County wholesale reclaimed water service (Pinellas Park, St. Pete Beach and South Pasadena). All areas identified except Tarpon Springs use wholesale water purchased from the Pinellas County system.

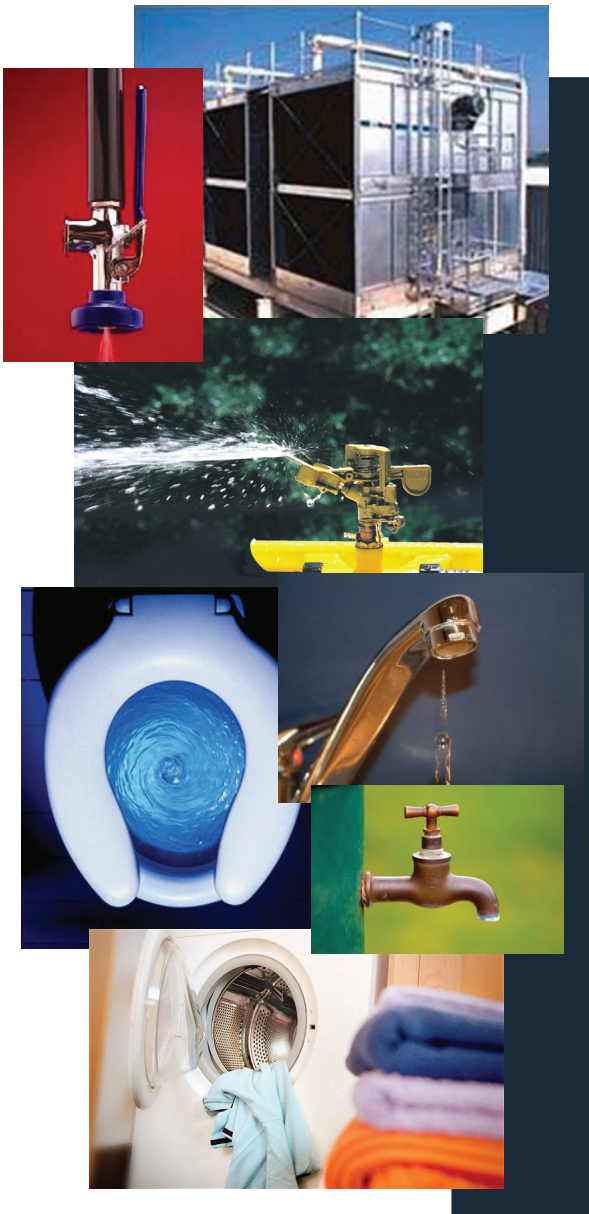
The Compilation of Member Government 5-year Conservation Plans are updated annually, through member government input and will be used to evaluate future potential in the 2018 update to the Demand Management Plan.

Appendix A

Demand Management Plan (DMP)

TAMPA BAY WATER

Supplying Water To The Region



Tampa Bay Water
Water Demand Management Plan
Final Report

December 2013

HAZEN AND SAWYER
Environmental Engineers & Scientists

41068-025c001

BACK

Executive Summary

ES.1 Background

Tampa Bay Water currently helps meet the water demands of more than 2.3 million people in the tri-county region. Residential demands accounted for nearly 75 percent of billed water consumption, with the remainder associated with the needs of commercial businesses and industry. The agency has been actively involved in quantifying water demand and potential changes in demand through water use efficiency efforts, mainly through member government implementation, since adoption of its original demand management plan the mid 1990's. Additionally, the agency developed tools to quantify ongoing member water use efficiency programs that helped to meet original Board of Directors adopted planning goals.

In 2013, approximately one-half of the water supplies for Tampa Bay Water member governments were dependent on the timing and quantity of local and regional rainfall. In order to meet reliability goals, it is important to understand how variability and uncertainties affect the planning and development of water supplies. As Tampa Bay Water's reliance on surface water and other alternative water sources continues to increase, the value of increased water use efficiency in managing future long-term supply needs has become evident. As new supply development costs continue to increase, avoided cost of water supply becomes a more critical element of the water supply planning process.

The Demand Management Plan (DMP) is an element of the Agency's Long-term Water Supply Plan and investigates the benefits and costs of water demand management as a quantifiable, alternative water supply source. The DMP is considered one component of the agency's strategic goals to achieve reliability of its water supply and delivery system to its member governments.

Demand side management efforts are intended to serve as a complementary component to traditional water supply planning processes in meeting current and future water demands. Demand-side management encompasses a set of activities designed to:

- Provide a better understanding of how and why water is used;
- Forecast human demands for water supplies;
- Develop prospective water-using efficiency (demand reduction) measures;
- Identify programmatic and project goals, evaluation criteria, performance measures, and monitoring mechanisms;

- Define and evaluate program effectiveness and goal achievement; and
- Evaluate the benefits and costs of efficiency measures as an alternative or complement to supply development.

Through efficient use of available supplies and use of targeted implementation strategies, water use efficiency can help manage peak and average day water demand in conjunction with reducing long-term future water supply requirements. Cost-effective alternatives to new supply development and other valuable benefits can be realized through demand side management including: optimization of existing facilities, deferred capital investment costs, improved public perception, support of future supply projects, and environmental stewardship and protection.

ES.2 Components of Tampa Bay Water's DMP

This DMP consists of a comprehensive investigation of benefits and costs of integrated water demand management as a quantifiable, alternative to conventional water supply sources, reflecting improvements in the state of water use efficiency occurring since 1995 when the first DMP was adopted. The update includes an evaluation of potential demand management projects as a beneficial tool for long-term water supply planning. Results define how water efficiency activities may fit into Tampa Bay Water's long-term water supply planning process, which includes supply reliability and member government long range demand projections. The DMP report is organized into seven sections:

- Section 1: Introduction
- Section 2: Data Collection and Database Integration
- Section 3: Regional Baseline Water Demand Profile
- Section 4: Analysis of Water Technologies and Baseline Water Use Efficiency
- Section 5: Passive Water Efficiency Evaluation
- Section 6: Active Water Efficiency Alternatives Evaluation
- Section 7: Summary and Recommended Strategies

The demand management evaluation effort includes an analysis of water savings (past and future) and an analysis of avoided supply costs related to improved water use efficiency. The "avoided supply cost" analysis considers increments of conserved water versus (a) cost to operate existing water supply sources and (b) total cost (capital and operating costs) to develop new water supply. Consideration of cost savings and water supply benefits permits a consistent "apples to apples" comparison to other water supply alternatives.

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ES.3 Regional Baseline Water Demand Profile

Demand profiling provides a greater understanding of demand trends and how these trends relate to or can be affected by water use efficiency improvements. The Regional Baseline Water Demand Profile quantifies and describes the water using and economic characteristics of Tampa Bay Water's member government customers. This includes an assessment of water savings estimates achieved from previously implemented conservation programs and the market for water efficiency technologies. The regional profile includes analyses of water use patterns among the major water using sectors in the Tampa Bay region.

ES.3.1 Distribution of Water Use

Characterization of water use relies on identification and assessment of water use trends over time, across sectors and geographies. Regionally, there are three major common sectoral uses of water, single-family residential (SF), multifamily residential (MF), and nonresidential (NR), which includes water used by businesses and institutions. The distribution of regional sectoral demands is illustrated in Figure ES.1. Regionally, single-family demand is greater than multifamily and nonresidential demands combined.

Weather-sensitive and weather-insensitive components of single-family demand were estimated regionally and for each member government over WY 2002 - 2008. Weather insensitive demand - predominantly indoor use - is generally influenced by the number of people residing in a household along with the presence and efficiency levels of various indoor domestic end uses (e.g., toilets, washing machines, etc.). Outdoor end uses are weather sensitive and tend to be a highly variable component of total water use. Outdoor uses are influenced both by weather and socioeconomic factors. Figure ES.2 illustrates the estimated proportion of weather-sensitive demands in the single-family sector by month through time. Annual average single-family household demand over the period 2002-2008 is 229 gpd, and is estimated to include 52 gpd of weather-sensitive and 177 gpd of weather-insensitive demand.

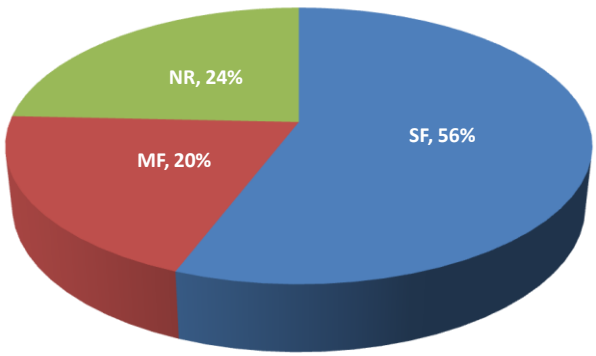

Figure ES.1: Distribution of Regional Sectoral Water Demands

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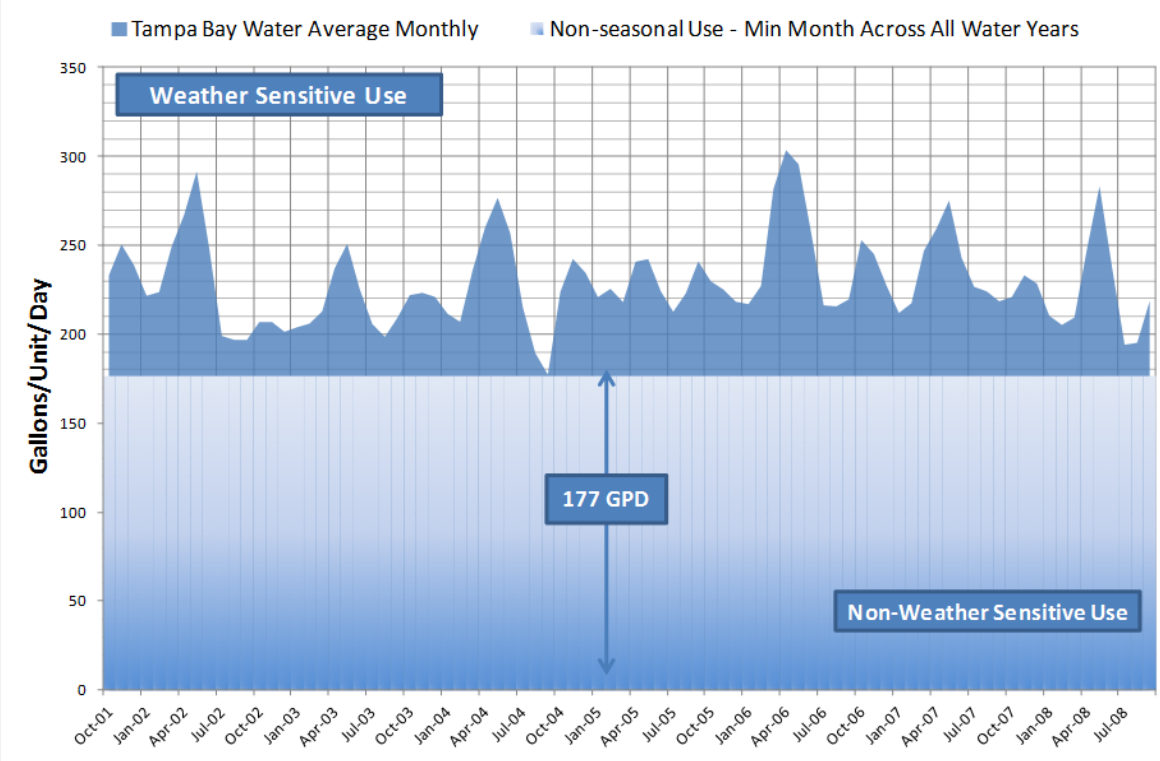

Figure ES.2: Regional Single-Family Weather-Sensitive and Weather-Insensitive Demands

ES.3.2 Evaluation of Achieved Water Savings from Existing Programs

Statistical evaluations were undertaken to measure and verify impacts of existing conservation programs implemented by member governments. The results of these evaluations can be summarized as follows:

- Member government ultra-low flow toilet rebate programs - The data indicates households having received one or more rebates, used nearly 12 percent less water on average after the change out of the toilet. Further analyses indicate homes with only one rebate averaged a 10.8 percent reduction.
- Florida-Friendly landscapes - Homes recognized by the County Extension offices as having both water wise landscape design and efficient irrigation technology and practices, used about 3-5 percent less after one year of participation and from 5-9 percent after two years.
- Member government irrigation evaluation programs - Although significant potential may exist, results suggest a diminution of savings over time, with an estimated reduction in water use by about 7 percent after one year of participating and only 3 percent after two years.

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ES.4 Analysis of Water Technologies and Baseline Water Use Efficiency

Through a literature review of available and emerging technologies/programs, a water efficiency program library (WEPL) of technically-applicable demand management technologies, programs and best management practices was developed for potential application in the Tampa Bay region. The library includes technologies and programs identified for preliminary assessment and information relating to cost, end use reduction, and durability, providing a menu of water conservation options expected to result in measurable water savings. Examples of residential end use technologies include toilets, showerheads, faucets, clothes washers, dishwashers and irrigation. Nonresidential end uses generally include those found in the residential sector, but also consist of technologies that can use substantial quantities of water used for cooling, heating and process water including product development (e.g. food service).

Estimates of water savings potential was based on a changing mix of water using technology, as well as the rate (or intensity) at which water using technology was used. Assessment of technology and program based savings potential required base-year (2008) estimates of distribution of fixture age and efficiency in region by sector of water use and market penetration of water efficient technologies. These estimates provide a baseline for examining remaining water efficiency potential over the agency's long-term water demand horizon (2035).

Parcel data provided current estimates of the distribution of fixture age and efficiency in region by sector of water use. In addition, a regional single-family survey was conducted to assist in quantifying prevailing water end uses and behaviors and the remaining potential for efficient technology. Market penetration by passive measures were assumed to be associated with plumbing standards and increased efficiency due to an evolving market (supply and demand) for water efficient products recognized or certified through the U.S. Environmental Protection Agency (EPA) WaterSense label and/or Energy Star programs.

Figure ES.3 illustrates estimated distribution of regional single-family water demands by end use in gallons per capita day for the Tampa Bay region. Table 1 provides estimated average end use flow rates. Based on this assessment, the greatest efficiency potential appears to exist in toilet, clothes washer and dishwasher use, with potential reductions in the 27-33 percent range under current federal standards and in the 33-55 percent range under high efficiency product benchmarks.

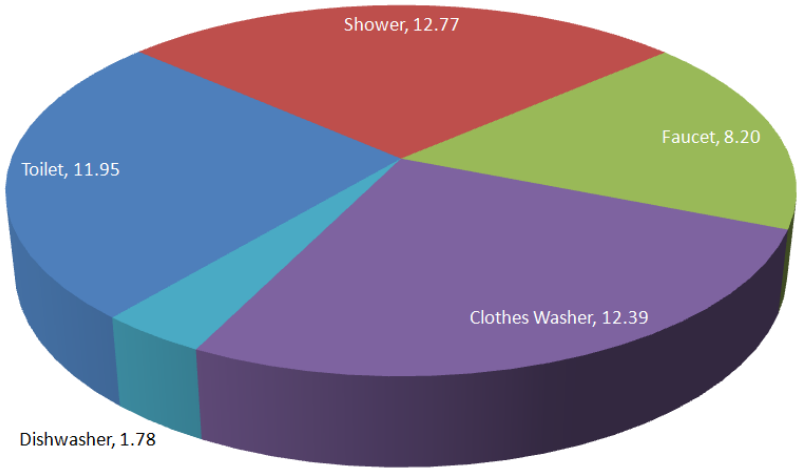

Figure ES.3: Estimated Distribution of Regional Single-Family End Uses of Water in Gallons/Capita/Day

Table ES-1
Estimated Baseline Single-Family Flow Rates, Gallons per Event (2008)

End Use	Tampa Bay Water	Current Standard	High Efficiency	Estimated % Reduction w/Standard Benchmark	Estimated % Reduction w/High Efficiency Benchmark
Toilet	2.39	1.60	1.28	-33%	-46%
Shower	2.10	2.50	2.00	19%	-5%
Faucet	1.01	2.20	1.50	117%	48%
Clothes Washer[1]	33.49	24.62	15.00	-26%	-55%
Dishwasher[2]	8.90	6.50	6.00	-27%	-33%

[1] Current standard based on 9.5 Water Factor, 2.7 cubic feet per load and .96 loads per day
[2] Current standard based on federal dishwasher standard effective January 2010.

ES.5 Evaluation of Water Efficiency Alternatives

Water savings can be realized from either passive or active water use efficiency measures.

- *Passive* water efficiency is achieved through a natural process of replacing old fixtures with new, more efficient fixtures as they wear out or become effectively obsolete or installing efficient water-using fixtures in new construction due to either codes or driven by market changes. Passive water efficiency typically occurs indoors with the replacement of toilets, clothes washers, dishwashers, and urinals.

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- *Active* water efficiency measures include programs designed to expedite the replacement process described above. Such programs are often sponsored by water utilities to ensure a target installation rate and associated water savings and can include outdoor efficiency technologies.

Estimating passive water savings is essential in determining efficacy of active water efficiency programs and for projecting long term water demands. Before the potential benefits of active water efficiency alternatives can be assessed, passive savings must be estimated.

An assessment of remaining passive efficiency potential was used to identify, develop, screen and select technically applicable active alternatives. The WEPL contains the complete listing of available indoor and outdoor measures for new homes, existing homes, and non-residential uses.

ES.5.1 Passive Water Efficiency Evaluation

The U.S. Energy Policy Act (EPAct), effective in 1994, mandated flow standards for many fixtures (e.g., toilets, faucets and showerheads, among others). Since then, manufacturers have introduced and marketed fixtures and appliances, which far exceed EPAct standards, leading to EPA WaterSense and Energy Star programming, which certify and label products meeting consumer expectations while performing at rates lower than current national efficiency standards. These programs influence the market by encouraging consumers to purchase high-efficiency (HE) water products. WaterSense labeled products require independent third-party certification of performance and product durability, insuring product use is consistent with labeling over a defined life. As consumers decide to purchase and install HE water products, water consumption efficiency increases.

The current (2011) Tampa Bay Water baseline demand forecast reflects water use of existing HE products within sectoral per account water use calculations, but does not integrate changes predicted in future product penetration. Accounting for prospective changes in market penetration allows adjustment to the baseline demand forecast reflecting market-based passive demand reductions.

Assumptions about efficiency standards, fixture life, and market penetration of high efficiency products, were used to estimate fixture distributions and water use for each year in the long-term demand forecast. Passive savings were estimated for residential toilets, washing machines and dishwashers as well as non-residential toilets and urinals. Figure ES.4 illustrates the estimated reduction in water demands from passive demand management programs relative to the baseline water demand forecast over the planning

horizon. By 2035, approximately 26 MGD of water savings potential is estimated and attributable to passive efficiency.

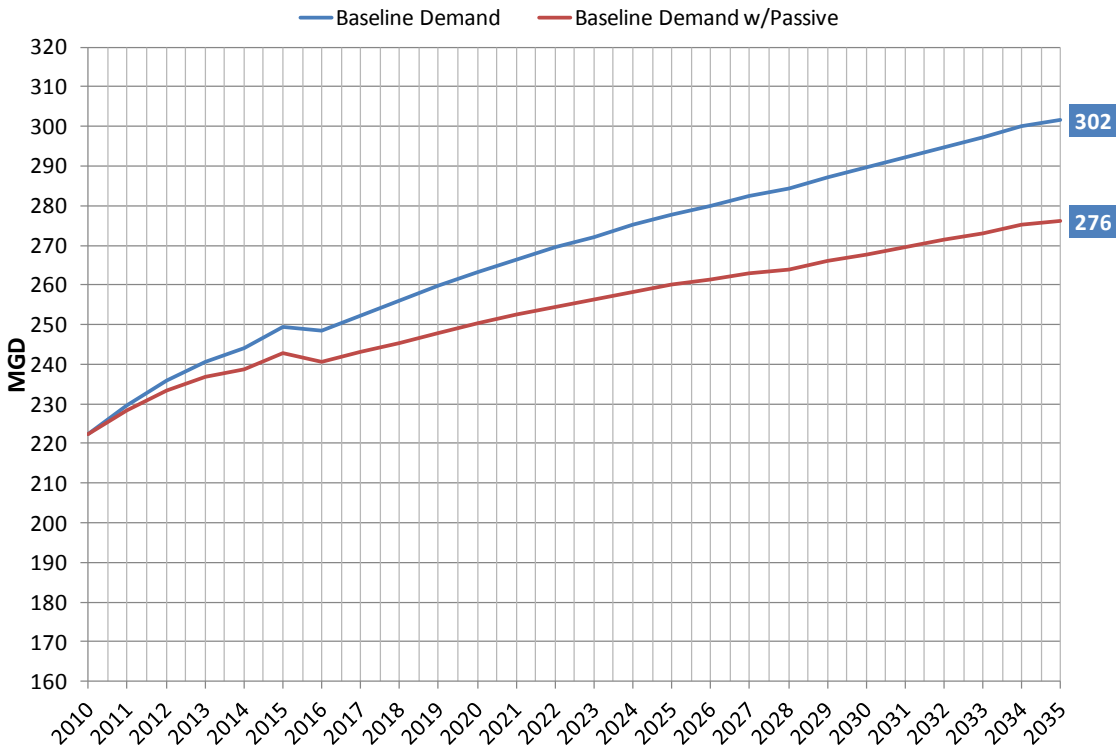

Figure ES.4: Baseline Demand Forecast with Passive Savings

ES.5.2 Active Water Efficiency Alternatives Evaluation

ES.5.2.1 Screening and Selection of Active Efficiency Technologies / Programs

Remaining market potential for water efficient technology (beyond what is likely accounted for by passive measures) was determined through the 2035 demand forecast planning horizon by screening the applicability of several active (utility-sponsored) programs. The screening process included 24 programs / technologies, either applied through existing programs (regionally and nationally), or developed based upon specific application of technologies in specific sectors or water end uses. Regional and national literature and other secondary sources, along with information gleaned from survey and analysis of regional water use characteristics supported the screening process.

The 10 programs meeting screening criteria and selected for inclusion in the Demand Management Plan portfolio are shown in Table 2. Of the 10 programs, 6 programs are applicable to the nonresidential (NR) sector, 3 to the single-family (SF) sector and 1 to

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the multi-family (MF) sector. Estimates of gallons saved reflect savings over the life of each measure, which vary depending on measure implementation assumptions, unit savings rates, and useful life of the technology. Programs not meeting this criteria may be cost effective for public use but do not offset future regional variable costs of water.

Estimates of cost-effectiveness were critical for screening, ranking and selection of conservation measures. Evaluation of relative cost-effectiveness of measures required estimation of the unit cost of water saved ($/1000 gallons) for each active measure. Estimated unit costs were compared with unit costs of supply alternatives to evaluate the viability of demand management alternatives. As identified in Table ES-2, the most cost-effective program is cooling tower retrofits at an average cost of $0.07/1000 gallons. The least cost-effective program identified selected is the Conveyor Dishwasher incentive program at an average cost of $0.42/1000 gallons.

Table ES-2
Water Efficiency Measures Meeting Screening Criteria

Activity Name	Class	Utility Costs ($/unit)	Savings, Useful Life (yrs)	Unit Savings, (gpy)	Gallons Saved Over Useful Life	$/1000 gal	BCR
Cooling Tower	NR	$1,000	10	1,386,530	13,865,300	$0.07	8.15
PRSV	NR	$30	10	37,426	374,260	$0.08	5.93
HEU (1/2 Gallon)	NR	$125	30	18,928	567,853	$0.22	1.24
ULFT (Valve-Type)	NR	$125	30	17,970	539,100	$0.23	1.29
Alternative Irrigation Source	SF	$750	25	94,034	2,350,850	$0.32	1.17
HET (Tank-Type)	NR	$125	30	12,843	385,290	$0.32	0.88
Residential HET	SF	$100	25	11,542	288,550	$0.35	1.09
ET/SMS Irrigation Controller	SF	$200	10	56,645	566,450	$0.35	1.82
Residential HET	MF	$75	25	8,111	202,775	$0.37	1.01
Conveyor Dishwasher	NR	$500	20	59,951	1,199,020	$0.42	1.08

ES.5.2.2 Development of Alternative "with Conservation" Demand Forecasts

Estimated impacts of passive water savings and potential active demand management alternatives on the region's long-term demands were evaluated over the planning horizon. Table ES-3 presents the 2010-2035 reliability-based (75th percentile) baseline water demand projections in five-year increments as compared to the demand projections produced when passive and active demand management programs are considered. Figure ES.5 illustrates the magnitude of estimated water demand reductions from both passive and active savings relative to the 75th percentile baseline demand forecast and current sustainable system capacity. As shown in Table ES-4, by 2035, a total of 37.8 MGD of water use reduction and savings potential was identified. Of this total, 25.5 MGD of wa-

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ter use reduction is associated with the impact of passive changes, while the estimated additional savings from active efficiency is 12.3 MGD.

Table ES-3
Comparison of Demand Projections Scenarios with Passive and Active Savings

Forecast Scenario (75th percentile)	Projected Water Demand (MGD)						Absolute Change	% Change 2008-2035	Average Annual % Change
	2010	2015	2020	2025	2030	2035			
Baseline Demand	222.2	249.3	263.3	277.8	289.7	301.5	79.3	35.7%	1.23%
Passive Savings	222.2	242.8	250.4	260.0	267.8	276.0	53.8	24.2%	0.87%
Passive/Active Savings	222.2	242.4	246.9	252.7	257.8	263.7	41.5	18.7%	0.69%

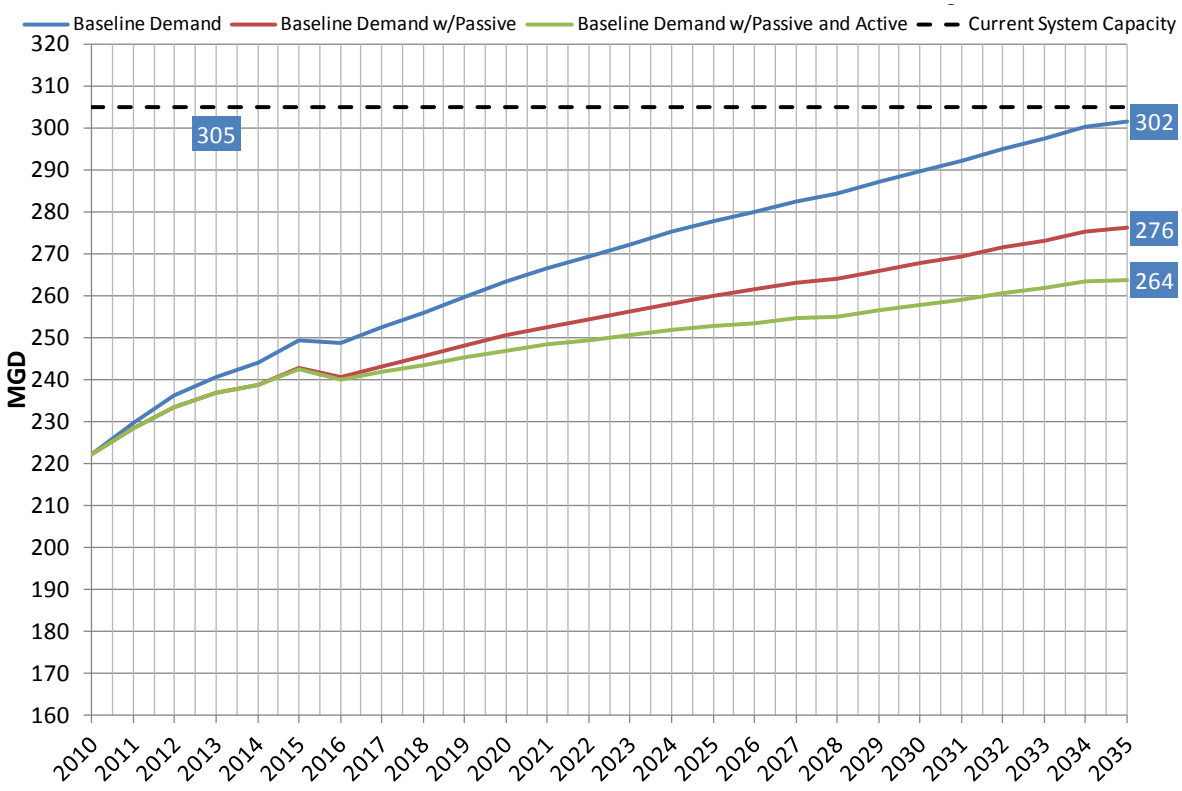

Figure ES.5: Baseline Demand Forecast with Passive and Active Savings

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Table ES-4
Projected Water Savings from Passive and Active Water Conservation

Forecast Scenario (75th percentile)	Projected Water Savings (MGD) / Percent Reduction					
	2010	2015	2020	2025	2030	2035
Passive Savings	0/0	6.6/2.6	12.9/4.9	17.8/6.4	21.9/7.6	25.5/8.5
Active Savings	0/0	0.3/0.1	3.5/1.3	7.3/2.6	10.0/3.5	12.3/4.1
Passive and Active Savings	0/0	6.9/2.8	16.4/6.2	25.1/9.0	31.9/11	37.8/12.5

ES.5.2.3 Avoided Cost Analysis of Alternative Demand Management Strategies

Quantification of supply-side benefits are based on the accrual of avoided costs demonstrates the benefits of proposed efficiency measures and deferral of source development. Avoided costs (or benefits) from water use efficiency generally result from[1]:

- Capital deferral;
- Capital elimination; and
- Reduction in variable cost.

Savings and costs were determined over a 60-year planning horizon (2010-2069) allowing savings rates in this analysis to mature over the life of the technology installed. Net avoided costs of viable demand management alternatives were evaluated over two separate timeframes; the total life of all savings and through the 2035 forecast horizon. When costs and benefits of the portfolio of viable demand management alternatives are evaluated over total life of the savings (through the end of 2065), a net present value of $25.8 million in benefits was identified (as shown in Table ES-5). Given these benefits and costs, the collective portfolio of demand management alternatives has a B/C ratio (benefits / costs) of 1.82. When costs and benefits are evaluated over the much shorter 2035 forecast horizon, the net present value of avoided costs remain positive but is reduced to $8.6 million.

Table ES-5
Net Present Value (NPV) of Avoided Costs

	PV Cost ($M)	PV Benefit ($M)	NPV ($M)	BCR
Life of Savings to 2065	$31.3	$57.1	$25.8	1.82
Life of Savings to 2035	$31.3	$39.9	$8.6	1.28

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[1] *Typically, avoided capital and operating costs from greater water efficiency are also associated with greater environmental benefits, because more water is available to serve ecological purposes. Environmental benefits of greater efficiency were not quantified as part of the Demand Management Plan Update.*

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ES.6 Tampa Bay Water Demand Management Plan Directives

As exemplified in Figure 5, incorporation of passive water use efficiency projections into the forecast reduces the demand forecast by 26 mgd in 2035, creating additional regional operational and supply flexibility. Based on this analysis and the need to track passive water use efficiency changes over time, The Tampa Bay Water Board of Directors adopted Board Resolution No. 2013-006 in February 2013 (Appendix Q). This resolution incorporates water use efficiency evaluation efforts into the Agency long-term water supply planning process consistent and in concert with the recommendations of this DMP. This resolution directs the Agency to:

- Develop and implement data collection, management and analysis protocols and procedures for the continued assessment of passive water use efficiency within Tampa Bay Water's service area.
- Integrate passive water-use efficiency into the Agency's Long-term Demand Forecast and Future Need Analysis.
- Include the Water Use Efficiency Evaluation as an element of the Long-term Water Supply Plan and include an updated evaluation of potential active measures for implementing efficient water-use products as part of future options for the next Long-term Water Supply

Incorporation of the effects of increased water-use efficiency into the Agency's long-term planning process provides the Board of Directors with more supply policy options, affords Tampa Bay Water and its member governments a supply buffer (increased water use efficiency reduces demand) and allows Tampa Bay Water to prepare and plan for observed and anticipated changes in water use efficiency. These activities should continue to be supported by the types of analytical methods and strategies described in this DMP, and through deliberate integration of anticipated water savings into ongoing water demand forecasting and supply planning.

Appendix B

Members Total (Exterior and Interior) Water Savings

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Tampa Bay Water

Regional Report
Table 1

Members Total (Interior & Exterior) Water Savings Report

	Historical Activity			5 - Year Plan					Total Cost	Plan Cost Effectiveness ($/ 1000 gal.) FY 2016 - FY 2020
	Pre - 1996	1996 - 2014	2015	2016	2017	2018	2019	2020		
Hillsborough County										
Annual Savings (MGD)	0.13	5.46	0.08	0.11	0.11	0.11	0.11	0.11		
Cumulative Savings (MGD)	0.13	5.46	5.54	5.65	5.76	5.87	5.98	6.10		
Annual Cost	$663,024	$7,260,648	$94,845	$132,299	$123,644	$115,555	$107,995	$100,930	$ 580,424	0.16
Pasco County										
Annual Savings (MGD)	0.01	2.79	0.44	0.16	0.16	0.16	0.16	0.16		
Cumulative Savings (MGD)	0.01	2.79	3.23	3.39	3.54	3.70	3.85	4.01		
Annual Cost	$0	$330,596	$161,056	$143,800	$134,393	$125,600	$117,384	$109,704	$ 630,881	0.12
Pinellas County										
Annual Savings (MGD)	0.00	10.29	0.07	0.39	0.39	0.39	0.39	0.39		
Cumulative Savings (MGD)	0.00	10.29	10.36	10.75	11.14	11.53	11.92	12.30		
Annual Cost	$0	$205,788,088	$1,872,080	$9,901,966	$9,254,174	$8,648,761	$8,082,954	$7,554,162	$ 43,442,017	3.40
City of New Port Richey										
Annual Savings (MGD)	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00		
Cumulative Savings (MGD)	0.00	0.05	0.05	0.05	0.05	0.05	0.05	0.05		
Annual Cost	$0	$0	$144	$0	$0	$0	$0	$0	$ 0	0.00
City of St. Petersburg										
Annual Savings (MGD)	1.79	3.44	0.05	0.06	0.06	0.06	0.06	0.01		
Cumulative Savings (MGD)	1.79	3.44	3.49	3.54	3.60	3.66	3.71	2.04		
Annual Cost	$21,556,260	$19,349,474	$111,106	$169,966	$158,847	$148,455	$138,743	$47,834	$ 663,845	0.43
City of Tampa										
Annual Savings (MGD)	0.19	1.95	0.06	0.02	0.02	0.02	0.02	0.02		
Cumulative Savings (MGD)	0.19	1.95	2.02	2.04	2.06	2.08	2.10	2.12		
Annual Cost	$813,056	$42,215,924	$1,147,650	$348,105	$325,332	$304,048	$284,157	$265,568	$ 1,527,210	2.31
Total Annual Savings (mgd)	2.12	23.98	0.70	0.73	0.73	0.73	0.73	0.68		
Total Cum. Savings (mgd)	2.12	23.98	24.69	25.42	26.15	26.88	27.61	28.30		
Total Annual Cost	$23,032,340	$274,944,731	$3,386,881	$10,696,136	$9,996,389	$9,342,420	$8,731,233	$8,078,198	$ 46,844,377	1.97

MGD - - Million gallons per day

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Appendix C

Members Exterior Water Savings

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Tampa Bay Water

Regional Report
Table 2

Members Combined Exterior Water Savings Report

	Historical Activity			5 - Year Plan					Total Cost	Plan Cost Effectiveness ($/ 1000 gal.) FY 2016 - FY 2020
	Pre - 1996	1996 - 2014	2015	2016	2017	2018	2019	2020		
Hillsborough County										
Annual Savings (MGD)	0.00	4.05	0.06	0.10	0.10	0.10	0.10	0.10		
Cumulative Savings (MGD)	0.00	4.05	4.11	4.20	4.30	4.40	4.49	4.59		
Annual Cost	$0	$112,500	$12,500	$73,500	$68,692	$64,198	$59,998	$56,073	$ 322,460	0.10
Pasco County										
Annual Savings (MGD)	0.01	2.73	0.41	0.13	0.13	0.13	0.13	0.13		
Cumulative Savings (MGD)	0.01	2.73	3.14	3.27	3.40	3.53	3.66	3.79		
Annual Cost	$0	$0	$0	$0	$0	$0	$0	$0	$ 0	0.00
Pinellas County										
Annual Savings (MGD)	0.00	7.78	0.07	0.39	0.39	0.39	0.39	0.39		
Cumulative Savings (MGD)	0.00	7.78	7.86	8.25	8.63	9.02	9.41	9.80		
Annual Cost	$0	$190,382,668	$1,872,080	$9,901,966	$9,254,174	$8,648,761	$8,082,954	$7,554,162	$ 43,442,017	3.40
City of New Port Richey										
Annual Savings (MGD)	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00		
Cumulative Savings (MGD)	0.00	0.05	0.05	0.05	0.05	0.05	0.05	0.05		
Annual Cost	$0	$0	$0	$0	$0	$0	$0	$0	$ 0	0.00
City of St. Petersburg										
Annual Savings (MGD)	1.79	2.43	0.02	0.03	0.03	0.03	0.03	0.01		
Cumulative Savings (MGD)	1.79	2.43	2.45	2.48	2.51	2.54	2.57	1.36		
Annual Cost	$21,556,260	$15,569,875	$22,251	$90,064	$84,172	$78,666	$73,519	$47,834	$ 374,256	0.47
City of Tampa										
Annual Savings (MGD)	0.04	1.39	0.06	0.02	0.02	0.02	0.02	0.02		
Cumulative Savings (MGD)	0.04	1.39	1.45	1.47	1.49	1.51	1.53	1.55		
Annual Cost	$0	$39,531,222	$1,147,650	$348,105	$325,332	$304,048	$284,157	$265,568	$ 1,527,210	2.31
Total Annual Savings (mgd)	1.84	18.43	0.62	0.66	0.66	0.66	0.66	0.64		
Total Cum. Savings (mgd)	1.84	18.43	19.06	19.72	20.38	21.05	21.71	22.35		
Total Annual Cost	$21,556,260	$245,596,265	$3,054,481	$10,413,635	$9,732,370	$9,095,673	$8,500,629	$7,923,636	$ 45,665,943	2.11

MGD - - Million gallons per day

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Appendix D

Members Interior Water Savings

Tampa Bay Water

Regional Report
Table 3

Members Combined Interior Water Savings Report

	Historical Activity			5 - Year Plan					Total Cost	Plan Cost Effectiveness ($/ 1000 gal.) FY 2016 - FY 2020
	Pre - 1996	1996 - 2014	2015	2016	2017	2018	2019	2020		
Hillsborough County										
Annual Savings (MGD)	0.13	1.41	0.02	0.01	0.01	0.01	0.01	0.01		
Cumulative Savings (MGD)	0.13	1.41	1.43	1.45	1.46	1.48	1.49	1.50		
Annual Cost	$663,024	$7,148,148	$82,345	$58,799	$54,952	$51,357	$47,997	$44,857	$ 257,964	0.54
Pasco County										
Annual Savings (MGD)	0.00	0.06	0.03	0.03	0.03	0.03	0.03	0.03		
Cumulative Savings (MGD)	0.00	0.06	0.09	0.12	0.14	0.17	0.20	0.22		
Annual Cost	$0	$330,596	$161,056	$143,800	$134,393	$125,600	$117,384	$109,704	$ 630,881	0.72
Pinellas County										
Annual Savings (MGD)	0.00	2.50	0.00	0.00	0.00	0.00	0.00	0.00		
Cumulative Savings (MGD)	0.00	2.50	2.50	2.50	2.50	2.50	2.50	2.50		
Annual Cost	$0	$15,405,420	$0	$0	$0	$0	$0	$0	$ 0	0.00
City of New Port Richey										
Annual Savings (MGD)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Cumulative Savings (MGD)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Annual Cost	$0	$0	$144	$0	$0	$0	$0	$0	$ 0	0.00
City of St. Petersburg										
Annual Savings (MGD)	0.00	1.01	0.03	0.03	0.03	0.03	0.03	0.00		
Cumulative Savings (MGD)	0.00	1.01	1.03	1.06	1.09	1.12	1.15	0.68		
Annual Cost	$0	$3,779,599	$88,855	$79,902	$74,675	$69,789	$65,224	$0	$ 289,590	0.39
City of Tampa										
Annual Savings (MGD)	0.15	0.56	0.00	0.00	0.00	0.00	0.00	0.00		
Cumulative Savings (MGD)	0.15	0.56	0.56	0.56	0.56	0.56	0.56	0.56		
Annual Cost	$813,056	$2,684,702	$0	$0	$0	$0	$0	$0	$ 0	0.00
Total Annual Savings (mgd)	0.28	5.55	0.08	0.07	0.07	0.07	0.07	0.04		
Total Cum. Savings (mgd)	0.28	5.55	5.63	5.70	5.76	5.83	5.90	5.94		
Total Annual Cost	$1,476,080	$29,348,466	$332,400	$282,501	$264,020	$246,747	$230,605	$154,562	$ 1,178,434	0.56

MGD - - Million gallons per day

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Appendix E

BMP Implementation Status

Tampa Bay Water

Regional Report
Table 4

BMP Template
Outdoor
Multi-Family

	Historical Activity		Current Year	5 Year Plan 2016 - 2020					Total Scenario Cost	Total Water Savings (MG)	Scenario Cost Effectiveness ($/1000 gal.)
	Pre - 96	1996 - 2014	2015	2016	2017	2018	2019	2020			
Description: Hillsborough Soil Moisture Sensor Rebate - MF											
Hillsborough County Accounts / Year	0	0	0	120	120	120	120	120	$ 26,323	611	0.04
Savings Rate (gpad)	155	155	155	155	155	155	155	155			
Annual Savings (mgd)	0.00	0.00	0.00	0.02	0.02	0.02	0.02	0.02			
Cumulative Savings (mgd)	0.00	0.00	0.00	0.02	0.04	0.06	0.07	0.09			
Cost / Connection	$50	$50	$50	$50	$50	$50	$50	$50			
Annual Cost	$0	$0	$0	$6,000	$6,000	$6,000	$6,000	$6,000			
Description: Rain Sensor Giveaway Program 2015- MF											
City of St. Petersburg Accounts / Year	0	192	5	5	5	5	5		$ 505	15	0.20
Savings Rate (gpad)	94	94	94	94	94	94	94	94			
Annual Savings (mgd)	0.00	0.02	0.00	0.00	0.00	0.00	0.00				
Cumulative Savings (mgd)	0.00	0.02	0.02	0.02	0.02	0.02	0.02				
Cost / Connection	$23	$23	$23	$23	$23	$23	$23	$23			
Annual Cost	$0	$4,416	$115	$115	$115	$115	$115				
Total Annual Savings (mgd)	0.00	0.02	0.00	0.02	0.02	0.02	0.02	0.02		626	
Total Cumulative Savings (mgd)	0.00	0.02	0.02	0.04	0.06	0.08	0.09	0.11			
Total Cost	$0	$4,416	$115	$6,115	$6,115	$6,115	$6,115	$6,000	$ 26,828		

* gpad - Gallons Per Account per Day
* gpud - - Gallons Per Unit per Day
* gpmd - - Gallons Per Measures per Day
* mgd - - Million Gallons per Day

Note: For detailed explanation of this BMP refer to "Potable Water Conservation Best Management Practices for the Tampa Bay Region" report.

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Tampa Bay Water

Regional Report
Table 5

BMP Template
Outdoor
Non-Residential

	Historical Activity		Current Year	5 Year Plan 2016 -					Total Scenario Cost	Total Water Savings (MG)	Scenario Cost Effectiveness ($/1000 gal.)
	Pre - 96	1996 - 2014	2015	2016	2017	2018	2019				
Description: Rain Sensor Giveaway Program 2015- NR											
City of St. Petersburg Accounts / Year	0	348	5	5	5	5	5		$ 505	156	0.02
Savings Rate (gpad)	951	951	951	951	951	951	951	951			
Annual Savings (mgd)	0.00	0.33	0.00	0.00	0.00	0.00	0.00				
Cumulative Savings (mgd)	0.00	0.33	0.34	0.35	0.35	0.35	0.36				
Cost / Connection	$23	$23	$23	$23	$23	$23	$23	$23			
Annual Cost	$0	$8,004	$115	$115	$115	$115	$115				
Total Annual Savings (mgd)	0.00	0.33	0.00	0.00	0.00	0.00	0.00			156	
Total Cumulative Savings (mgd)	0.00	0.33	0.34	0.34	0.35	0.35	0.35				
Total Cost	$0	$8,004	$115	$115	$115	$115	$115		$ 505		

* gpad - Gallons Per Account per Day
* gpud - - Gallons Per Unit per Day
* gpmd - - Gallons Per Measures per Day
* mgd - - Million Gallons per Day

Note: For detailed explanation of this BMP refer to "Potable Water Conservation Best Management Practices for the Tampa Bay Region" report.

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Tampa Bay Water

Regional Report

Table 6

BMP Template
Outdoor
Single Family

The objective of this BMP is to allow flexibility for a member government to create its own BMP or to combine two or more BMPs. This BMP is for outdoor water use by single family residences.

	Historical Activity		Current Year	5 Year Plan 2016 -					Total Scenario Cost	Total Water Savings (MG)	Scenario Cost Effectiveness ($/1000 gal.)
	Pre - 96	1996 - 2014	2015	2016	2017	2018	2019				
Description: Rain Sensor Giveaway Program 2015- SF											
City of St. Petersburg Accounts / Year	0	4,235	30	30	30	30	30		$ 3,027	120	0.15
Savings Rate (gpad)	122	122	122	122	122	122	122	122			
Annual Savings (mgd)	0.00	0.52	0.00	0.00	0.00	0.00	0.00				
Cumulative Savings (mgd)	0.00	0.52	0.52	0.53	0.53	0.53	0.54				
Cost / Connection	$23	$23	$23	$23	$23	$23	$23	$23			
Annual Cost	$0	$97,405	$690	$690	$690	$690	$690				
Total Annual Savings (mgd)	0.00	0.52	0.00	0.00	0.00	0.00	0.00			120	
Total Cumulative Savings (mgd)	0.00	0.52	0.52	0.52	0.53	0.53	0.53				
Total Cost	$0	$97,405	$690	$690	$690	$690	$690		$ 3,027		

* gpad - Gallons Per Account per Day
* gpud - - Gallons Per Unit per Day
* gpmd - - Gallons Per Measures per Day
* mgd - - Million Gallons per Day

Note: For detailed explanation of this BMP refer to "Potable Water Conservation Best Management Practices for the Tampa Bay Region" report.

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Tampa Bay Water

Regional Report

Table 7

Non-Potable Irrigation Sources
Groundwater from a shallow well
Single Family

This program provides rebates to single-family residents that change their irrigation water source from potable to groundwater by installing a groundwater well.

	Historical Activity		Current Year	5 Year Plan 2016 - 2020					Total Scenario Cost	Total Water Savings (MG)	Scenario Cost Effectiveness ($/1000 gal.)
	Pre - 96	1996 - 2014	2015	2016	2017	2018	2019	2020			
Pinellas County											
Accounts / Year	0	1,533	0	0	0	0	0	0			
Savings Rate (gpad)	199	199	199	199	199	199	199	199			
Annual Savings (mgd)	0.00	0.31	0.00	0.00	0.00	0.00	0.00	0.00	$ 0	0	0.00
Cumulative Savings (mgd)	0.00	0.31	0.31	0.31	0.31	0.31	0.31	0.31			
Cost / Connection	$340	$340	$340	$340	$340	$340	$340	$340			
Annual Cost	$0	$521,220	$0	$0	$0	$0	$0	$0			
Total Annual Savings (mgd)	0.00	0.31	0.00	0.00	0.00	0.00	0.00	0.00		0	
Total Cumulative Savings (mgd)	0.00	0.31	0.31	0.31	0.31	0.31	0.31	0.31			
Total Cost	$0	$521,220	$0	$0	$0	$0	$0	$0	$ 0		

* gpad - Gallons Per Account per Day
* gpud - - Gallons Per Unit per Day
* gpmd - - Gallons Per Measures per Day
* mgd - - Million Gallons per Day

Note: For detailed explanation of this BMP refer to "Potable Water Conservation Best Management Practices for the Tampa Bay Region" report.

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Tampa Bay Water

Regional Report

Table 8

Non-Potable Irrigation Sources
Other irrigation sources
Single Family

This program provides rebates to single-family residents that change their irrigation water source from potable to a non-potable source other than reclaimed or groundwater. Other sources include cisterns, gray-water systems, drip irrigation of septic tank effluent and surface water pumping.

	Historical Activity		Current Year	5 Year Plan 2016 - 2020					Total Scenario Cost	Total Water Savings (MG)	Scenario Cost Effectiveness ($/1000 gal.)
	Pre - 96	1996 - 2014	2015	2016	2017	2018	2019	2020			
Pinellas County											
Accounts / Year	0	371	0	0	0	0	0	0			
Savings Rate (gpad)	199	199	199	199	199	199	199	199			
Annual Savings (mgd)	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	$ 0	0	0.00
Cumulative Savings (mgd)	0.00	0.07	0.07	0.07	0.07	0.07	0.07	0.07			
Cost / Connection	$340	$340	$340	$340	$340	$340	$340	$340			
Annual Cost	$0	$126,140	$0	$0	$0	$0	$0	$0			
Total Annual Savings (mgd)	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00		0	
Total Cumulative Savings (mgd)	0.00	0.07	0.07	0.07	0.07	0.07	0.07	0.07			
Total Cost	$0	$126,140	$0	$0	$0	$0	$0	$0	$ 0		

* gpad - Gallons Per Account per Day
* gpud - - Gallons Per Unit per Day
* gpmd - - Gallons Per Measures per Day
* mgd - - Million Gallons per Day

Note: For detailed explanation of this BMP refer to "Potable Water Conservation Best Management Practices for the Tampa Bay Region" report.

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Tampa Bay Water

Regional Report

Table 9

Non-Potable Irrigation Sources
Reclaimed Water
Multi-Family

Multi-family residences are provided reclaimed water service to replace potable water as their irrigation source.

	Historical Activity		Current Year	5 Year Plan 2016 - 2020					Total Scenario Cost	Total Water Savings (MG)	Scenario Cost Effectiveness ($/1000 gal.)
	Pre - 96	1996 - 2014	2015	2016	2017	2018	2019	2020			
Hillsborough County											
Accounts / Year	0	21	0	0	0	0	0	0			
Savings Rate (gpad)	0	0	0	0	0	0	0	0			
Annual Savings (mgd)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	$ 0	0	0.00
Cumulative Savings (mgd)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
Cost / Connection	$0	$0	$0	$0	$0	$0	$0	$0			
Annual Cost	$0	$0	$0	$0	$0	$0	$0	$0			
Pasco County											
Accounts / Year	50	2,050	2,100	0	0	0	0	0			
Savings Rate (gpad)	0	0	0	0	0	0	0	0			
Annual Savings (mgd)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	$ 0	0	0.00
Cumulative Savings (mgd)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
Cost / Connection	$0	$0	$0	$0	$0	$0	$0	$0			
Annual Cost	$0	$0	$0	$0	$0	$0	$0	$0			
Pinellas County											
Accounts / Year	0	939	0	93	93	93	93	93			
Savings Rate (gpad)	300	300	300	300	300	300	300	300			
Annual Savings (mgd)	0.00	0.28	0.00	0.03	0.03	0.03	0.03	0.03	$ 2,727,959	917	2.98
Cumulative Savings (mgd)	0.00	0.28	0.28	0.31	0.34	0.37	0.39	0.42			
Cost / Connection	$6,686	$6,686	$6,686	$6,686	$6,686	$6,686	$6,686	$6,686			
Annual Cost	$0	$6,278,154	$0	$621,798	$621,798	$621,798	$621,798	$621,798			
City of New Port Richey											
Accounts / Year	0	1	0	0	0	0	0	0			
Savings Rate (gpad)	0	0	0	0	0	0	0	0			
Annual Savings (mgd)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	$ 0	0	0.00
Cumulative Savings (mgd)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
Cost / Connection	$0	$0	$0	$0	$0	$0	$0	$0			
Annual Cost	$0	$0	$0	$0	$0	$0	$0	$0			
City of St. Petersburg											
Accounts / Year	0	134	1	5	5	5	5	5			
Savings Rate (gpad)	713	713	713	713	713	713	713	713			
Annual Savings (mgd)	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	$ 68,770	117	0.59
Cumulative Savings (mgd)	0.00	0.10	0.10	0.10	0.10	0.11	0.11	0.11			
Cost / Connection	$3,135	$3,135	$3,135	$3,135	$3,135	$3,135	$3,135	$3,135			
Annual Cost	$0	$420,090	$3,135	$15,675	$15,675	$15,675	$15,675	$15,675			
City of Tampa											
Accounts / Year	0	167	10	10	10	10	10	10			
Savings Rate (gpad)	625	625	625	625	625	625	625	625			
Annual Savings (mgd)	0.00	0.10	0.01	0.01	0.01	0.01	0.01	0.01	$ 220,063	205	1.07
Cumulative Savings (mgd)	0.00	0.10	0.11	0.12	0.12	0.13	0.14	0.14			
Cost / Connection	$5,016	$5,016	$5,016	$5,016	$5,016	$5,016	$5,016	$5,016			
Annual Cost	$0	$837,672	$50,160	$50,160	$50,160	$50,160	$50,160	$50,160			
Total Annual Savings (mgd)	0.00	0.48	0.01	0.04	0.04	0.04	0.04	0.04		1,239	
Total Cumulative Savings (mgd)	0.00	0.48	0.49	0.53	0.56	0.60	0.64	0.68			
Total Cost	$0	$7,535,916	$53,295	$687,633	$687,633	$687,633	$687,633	$687,633	$ 3,016,791		

* gpad - Gallons Per Account per Day
* gpud - - Gallons Per Unit per Day
* gpmd - - Gallons Per Measures per Day
* mgd - - Million Gallons per Day

Note: For detailed explanation of this BMP refer to "Potable Water Conservation Best Management Practices for the Tampa Bay Region" report.

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Tampa Bay Water

Regional Report

Table 10

Non-Potable Irrigation Sources
Reclaimed Water
Non-Residential

Non-residential properties are provided reclaimed water service to replace potable water as their irrigation source.

	Historical Activity		Current Year	5 Year Plan 2016 - 2020					Total Scenario Cost	Total Water Savings (MG)	Scenario Cost Effectiveness ($/1000 gal.)
	Pre - 96	1996 - 2014	2015	2016	2017	2018	2019	2020			
Hillsborough County											
Accounts / Year	0	22	0	0	0	0	0	0			
Savings Rate (gpad)	0	0	0	0	0	0	0	0			
Annual Savings (mgd)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	$ 0	0	0.00
Cumulative Savings (mgd)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
Cost / Connection	$0	$0	$0	$0	$0	$0	$0	$0			
Annual Cost	$0	$0	$0	$0	$0	$0	$0	$0			
Pasco County											
Accounts / Year	120	118	238	0	0	0	0	0			
Savings Rate (gpad)	0	0	0	0	0	0	0	0			
Annual Savings (mgd)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	$ 0	0	0.00
Cumulative Savings (mgd)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
Cost / Connection	$0	$0	$0	$0	$0	$0	$0	$0			
Annual Cost	$0	$0	$0	$0	$0	$0	$0	$0			
Pinellas County											
Accounts / Year	0	1,178	11	70	70	70	70	70			
Savings Rate (gpad)	296	296	296	296	296	296	296	296			
Annual Savings (mgd)	0.00	0.35	0.00	0.02	0.02	0.02	0.02	0.02	$ 2,053,303	680	3.02
Cumulative Savings (mgd)	0.00	0.35	0.35	0.37	0.39	0.41	0.43	0.46			
Cost / Connection	$6,686	$6,686	$6,686	$6,686	$6,686	$6,686	$6,686	$6,686			
Annual Cost	$0	$7,876,108	$73,546	$468,020	$468,020	$468,020	$468,020	$468,020			
City of New Port Richey											
Accounts / Year	0	39	0	0	0	0	0	0			
Savings Rate (gpad)	0	0	0	0	0	0	0	0			
Annual Savings (mgd)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	$ 0	0	0.00
Cumulative Savings (mgd)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
Cost / Connection	$0	$0	$0	$0	$0	$0	$0	$0			
Annual Cost	$0	$0	$0	$0	$0	$0	$0	$0			
City of St. Petersburg											
Accounts / Year	200	395	2	5	5	5	5	5			
Savings Rate (gpad)	345	345	345	345	345	345	345	345			
Annual Savings (mgd)	0.07	0.14	0.00	0.00	0.00	0.00	0.00	0.00	$ 68,770	57	1.21
Cumulative Savings (mgd)	0.07	0.14	0.14	0.14	0.14	0.14	0.14	0.15			
Cost / Connection	$3,135	$3,135	$3,135	$3,135	$3,135	$3,135	$3,135	$3,135			
Annual Cost	$627,000	$1,238,325	$6,270	$15,675	$15,675	$15,675	$15,675	$15,675			
City of Tampa											
Accounts / Year	0	534	2	1	1	1	1	1			
Savings Rate (gpad)	972	972	972	972	972	972	972	972			
Annual Savings (mgd)	0.00	0.52	0.00	0.00	0.00	0.00	0.00	0.00	$ 206,835	32	6.48
Cumulative Savings (mgd)	0.00	0.52	0.52	0.52	0.52	0.52	0.52	0.53			
Cost / Connection	$47,145	$47,145	$47,145	$47,145	$47,145	$47,145	$47,145	$47,145			
Annual Cost	$0	$25,175,430	$94,290	$47,145	$47,145	$47,145	$47,145	$47,145			
Total Annual Savings (mgd)	0.07	1.00	0.01	0.02	0.02	0.02	0.02	0.02		769	
Total Cumulative Savings (mgd)	0.07	1.00	1.01	1.03	1.06	1.08	1.10	1.13			
Total Cost	$627,000	$34,289,863	$174,106	$530,840	$530,840	$530,840	$530,840	$530,840	$ 2,328,907		

* gpad - Gallons Per Account per Day
* gpud - - Gallons Per Unit per Day
* gpmd - - Gallons Per Measures per Day
* mgd - - Million Gallons per Day

Note: For detailed explanation of this BMP refer to "Potable Water Conservation Best Management Practices for the Tampa Bay Region" report.

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Tampa Bay Water

Regional Report

Table 11

Non-Potable Irrigation Sources
Reclaimed Water
Single Family

Single-family residences are provided reclaimed water service to replace potable water as their irrigation source.

	Historical Activity		Current Year	5 Year Plan 2016 - 2020					Total Scenario Cost	Total Water Savings (MG)	Scenario Cost Effectiveness ($/1000 gal.)
	Pre - 96	1996 - 2014	2015	2016	2017	2018	2019	2020			
Hillsborough County											
Accounts / Year	0	15,520	200	200	200	200	200	200	$ 0	1,695	0.00
Savings Rate (gpad)	258	258	258	258	258	258	258	258			
Annual Savings (mgd)	0.00	4.00	0.05	0.05	0.05	0.05	0.05	0.05			
Cumulative Savings (mgd)	0.00	4.00	4.06	4.11	4.16	4.21	4.26	4.31			
Cost / Connection	$0	$0	$0	$0	$0	$0	$0	$0			
Annual Cost	$0	$0	$0	$0	$0	$0	$0	$0			
Pasco County											
Accounts / Year	25	10,583	1,592	500	500	500	500	500	$ 0	4,238	0.00
Savings Rate (gpad)	258	258	258	258	258	258	258	258			
Annual Savings (mgd)	0.01	2.73	0.41	0.13	0.13	0.13	0.13	0.13			
Cumulative Savings (mgd)	0.01	2.73	3.14	3.27	3.40	3.53	3.66	3.79			
Cost / Connection	$0	$0	$0	$0	$0	$0	$0	$0			
Annual Cost	$0	$0	$0	$0	$0	$0	$0	$0			
Pinellas County											
Accounts / Year	0	26,261	269	1,318	1,318	1,318	1,318	1,318	$ 38,660,755	11,170	3.46
Savings Rate (gpad)	258	258	258	258	258	258	258	258			
Annual Savings (mgd)	0.00	6.78	0.07	0.34	0.34	0.34	0.34	0.34			
Cumulative Savings (mgd)	0.00	6.78	6.84	7.18	7.52	7.86	8.20	8.54			
Cost / Connection	$6,686	$6,686	$6,686	$6,686	$6,686	$6,686	$6,686	$6,686			
Annual Cost	$0	$175,581,046	$1,798,534	$8,812,148	$8,812,148	$8,812,148	$8,812,148	$8,812,148			
City of New Port Richey											
Accounts / Year	0	200	0	0	0	0	0	0	$ 0	0	0.00
Savings Rate (gpad)	258	258	258	258	258	258	258	258			
Annual Savings (mgd)	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00			
Cumulative Savings (mgd)	0.00	0.05	0.05	0.05	0.05	0.05	0.05	0.05			
Cost / Connection	$0	$0	$0	$0	$0	$0	$0	$0			
Annual Cost	$0	$0	$0	$0	$0	$0	$0	$0			
City of St. Petersburg											
Accounts / Year	6,676	4,233	-6	10	10	10	10	10	$ 137,539	85	1.62
Savings Rate (gpad)	258	258	258	258	258	258	258	258			
Annual Savings (mgd)	1.72	1.09	0.00	0.00	0.00	0.00	0.00	0.00			
Cumulative Savings (mgd)	1.72	1.09	1.09	1.09	1.10	1.10	1.10	1.10			
Cost / Connection	$3,135	$3,135	$3,135	$3,135	$3,135	$3,135	$3,135	$3,135			
Annual Cost	$20,929,260	$13,270,455	$-18,810	$31,350	$31,350	$31,350	$31,350	$31,350			
City of Tampa											
Accounts / Year	0	2,695	200	50	50	50	50	50	$ 1,100,313	424	2.60
Savings Rate (gpad)	258	258	258	258	258	258	258	258			
Annual Savings (mgd)	0.00	0.70	0.05	0.01	0.01	0.01	0.01	0.01			
Cumulative Savings (mgd)	0.00	0.70	0.75	0.76	0.77	0.79	0.80	0.81			
Cost / Connection	$5,016	$5,016	$5,016	$5,016	$5,016	$5,016	$5,016	$5,016			
Annual Cost	$0	$13,518,120	$1,003,200	$250,800	$250,800	$250,800	$250,800	$250,800			
Total Annual Savings (mgd)	1.73	15.35	0.58	0.54	0.54	0.54	0.54	0.54		17,612	
Total Cumulative Savings (mgd)	1.73	15.35	15.93	16.47	17.00	17.54	18.08	18.61			
Total Cost	$20,929,260	$202,369,621	$2,782,924	$9,094,298	$9,094,298	$9,094,298	$9,094,298	$9,094,298	$ 39,898,607		

* gpad - Gallons Per Account per Day
* gpud - - Gallons Per Unit per Day
* gpmd - - Gallons Per Measures per Day
* mgd - - Million Gallons per Day

Note: For detailed explanation of this BMP refer to "Potable Water Conservation Best Management Practices for the Tampa Bay Region" report.

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Tampa Bay Water

Regional Report

Table 12

Water-Efficient Landscape and Irrigation Evaluations and Rebates
Irrigation Evaluation w/ Rebates
Multi-Family

This program provides water-efficient landscape and irrigation evaluations with rebates to multi-family residences. It is designed to save potable water used for irrigation through efficient irrigation practices and the use of water-efficient landscape designs.

	Historical Activity		Current Year	5 Year Plan 2016 - 2020					Total Scenario Cost	Total Water Savings (MG)	Scenario Cost Effectiveness ($/1000 gal.)
	Pre - 96	1996 - 2014	2015	2016	2017	2018	2019	2020			
Hillsborough County											
Accounts / Year	0	45	5	27	27	27	27	27			
Savings Rate (gpad)	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000			
Annual Savings (mgd)	0.00	0.05	0.01	0.03	0.03	0.03	0.03	0.03	$ 296,137	887	0.33
Cumulative Savings (mgd)	0.00	0.05	0.05	0.08	0.10	0.13	0.16	0.19			
Cost / Connection	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500			
Annual Cost	$0	$112,500	$12,500	$67,500	$67,500	$67,500	$67,500	$67,500			
City of Tampa											
Accounts / Year	0	6	0	0	0	0	0	0			
Savings Rate (gpad)	0	0	0	0	0	0	0	0			
Annual Savings (mgd)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	$ 0	0	0.00
Cumulative Savings (mgd)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
Cost / Connection	$0	$0	$0	$0	$0	$0	$0	$0			
Annual Cost	$0	$0	$0	$0	$0	$0	$0	$0			
Total Annual Savings (mgd)	0.00	0.05	0.01	0.03	0.03	0.03	0.03	0.03		887	
Total Cumulative Savings (mgd)	0.00	0.05	0.05	0.08	0.10	0.13	0.16	0.19			
Total Cost	$0	$112,500	$12,500	$67,500	$67,500	$67,500	$67,500	$67,500	$ 296,137		

* gpad - Gallons Per Account per Day
* gpud - - Gallons Per Unit per Day
* gpmd - - Gallons Per Measures per Day
* mgd - - Million Gallons per Day

Note: For detailed explanation of this BMP refer to "Potable Water Conservation Best Management Practices for the Tampa Bay Region" report.

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Tampa Bay Water

Regional Report

Table 13

Water-Efficient Landscape and Irrigation Evaluations and Rebates
Irrigation Evaluation w/ Rebates
Single Family

This program provides water-efficient landscape and irrigation evaluations with rebates to single-family residences. It is designed to save potable water used for irrigation through efficient irrigation practices and the use of water-efficient landscape designs.

	Historical Activity		Current Year	5 Year Plan 2016 - 2020					Total Scenario Cost	Total Water Savings (MG)	Scenario Cost Effectiveness ($/1000 gal.)
	Pre - 96	1996 - 2014	2015	2016	2017	2018	2019	2020			
City of Tampa											
Accounts / Year	0	41	0	0	0	0	0	0			
Savings Rate (gpad)	39	39	39	39	39	39	39	39			
Annual Savings (mgd)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	$ 0	0	0.00
Cumulative Savings (mgd)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
Cost / Connection	$0	$0	$0	$0	$0	$0	$0	$0			
Annual Cost	$0	$0	$0	$0	$0	$0	$0	$0			
Total Annual Savings (mgd)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0	
Total Cumulative Savings (mgd)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
Total Cost	$0	$0	$0	$0	$0	$0	$0	$0	$ 0		

* gpad - Gallons Per Account per Day
* gpud - - Gallons Per Unit per Day
* gpmd - - Gallons Per Measures per Day
* mgd - - Million Gallons per Day

Note: For detailed explanation of this BMP refer to "Potable Water Conservation Best Management Practices for the Tampa Bay Region" report.

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Tampa Bay Water

Regional Report

Table 14

Water-Efficient Landscape and Irrigation Evaluations and Rebates
Irrigation Evaluation w/o Rebates
Multi-Family

This program provides water-efficient landscape and irrigation evaluations without rebates to multi-family residences. It is designed to save potable water used for irrigation through efficient irrigation practices and the use of water-efficient landscape designs.

	Historical Activity		Current Year	5 Year Plan 2016 -					Total Scenario Cost	Total Water Savings (MG)	Scenario Cost Effectiveness ($/1000 gal.)
	Pre - 96	1996 - 2014	2015	2016	2017	2018	2019				
City of St. Petersburg											
Accounts / Year	0	102	2	2	2	2	2		$ 3,492	9	2.23
Savings Rate (gpad)	143	143	143	143	143	143	143	143			
Annual Savings (mgd)	0.00	0.01	0.00	0.00	0.00	0.00	0.00				
Cumulative Savings (mgd)	0.00	0.01	0.01	0.02	0.02	0.02	0.02				
Cost / Connection	$398	$398	$398	$398	$398	$398	$398	$398			
Annual Cost	$0	$40,596	$796	$796	$796	$796	$796				
City of Tampa											
Accounts / Year	0	48	0	0	0	0	0	0	$ 0	0	0.00
Savings Rate (gpad)	0	0	0	0	0	0	0	0			
Annual Savings (mgd)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
Cumulative Savings (mgd)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
Cost / Connection	$0	$0	$0	$0	$0	$0	$0	$0			
Annual Cost	$0	$0	$0	$0	$0	$0	$0	$0			
Total Annual Savings (mgd)	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00		9	
Total Cumulative Savings (mgd)	0.00	0.01	0.01	0.02	0.02	0.02	0.02	0.02			
Total Cost	$0	$40,596	$796	$796	$796	$796	$796	$0	$ 3,492		

* gpad - Gallons Per Account per Day
* gpud - - Gallons Per Unit per Day
* gpmd - - Gallons Per Measures per Day
* mgd - - Million Gallons per Day

Note: For detailed explanation of this BMP refer to "Potable Water Conservation Best Management Practices for the Tampa Bay Region" report.

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Table 15

Water-Efficient Landscape and Irrigation Evaluations and Rebates
Irrigation Evaluation w/o Rebates
Non-Residential

This program provides water-efficient landscape and irrigation evaluations without rebates to non-residential properties. It is designed to save potable water used for irrigation through efficient irrigation practices and the use of water-efficient landscape designs.

	Historical Activity		Current Year	5 Year Plan 2016 -					Total Scenario Cost	Total Water Savings (MG)	Scenario Cost Effectiveness ($/1000 gal.)
	Pre - 96	1996 - 2014	2015	2016	2017	2018	2019				
City of St. Petersburg											
Accounts / Year	0	90	3	3	3	3	3				
Savings Rate (gpad)	978	978	978	978	978	978	978	978			
Annual Savings (mgd)	0.00	0.09	0.00	0.00	0.00	0.00	0.00		$ 5,107	96	0.32
Cumulative Savings (mgd)	0.00	0.09	0.09	0.10	0.10	0.10	0.11				
Cost / Connection	$388	$388	$388	$388	$388	$388	$388	$388			
Annual Cost	$0	$34,920	$1,164	$1,164	$1,164	$1,164	$1,164				
City of Tampa											
Accounts / Year	0	52	0	0	0	0	0	0			
Savings Rate (gpad)	0	0	0	0	0	0	0	0			
Annual Savings (mgd)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	$ 0	0	0.00
Cumulative Savings (mgd)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
Cost / Connection	$0	$0	$0	$0	$0	$0	$0	$0			
Annual Cost	$0	$0	$0	$0	$0	$0	$0	$0			
Total Annual Savings (mgd)	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00		96	
Total Cumulative Savings (mgd)	0.00	0.09	0.09	0.09	0.10	0.10	0.10	0.10			
Total Cost	$0	$34,920	$1,164	$1,164	$1,164	$1,164	$1,164	$0	$ 5,107		

* gpad - Gallons Per Account per Day
* gpud - - Gallons Per Unit per Day
* gpmd - - Gallons Per Measures per Day
* mgd - - Million Gallons per Day

Note: For detailed explanation of this BMP refer to "Potable Water Conservation Best Management Practices for the Tampa Bay Region" report.

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Regional Report

Table 16

Water-Efficient Landscape and Irrigation Evaluations and Rebates
Irrigation Evaluation w/o Rebates
Single Family

This program provides water-efficient landscape and irrigation evaluations without rebates to single-family residences. It is designed to save potable water used for irrigation through efficient irrigation practices and the use of water-efficient landscape designs.

	Historical Activity		Current Year	5 Year Plan 2016 -					Total Scenario Cost	Total Water Savings (MG)	Scenario Cost Effectiveness ($/1000 gal.)
	Pre - 96	1996 - 2014	2015	2016	2017	2018	2019				
City of St. Petersburg											
Accounts / Year	0	1,726	109	100	100	100	100				
Savings Rate (gpad)	81	81	81	81	81	81	81	81			
Annual Savings (mgd)	0.00	0.14	0.01	0.01	0.01	0.01	0.01		$ 115,822	266	2.61
Cumulative Savings (mgd)	0.00	0.14	0.15	0.16	0.17	0.18	0.19				
Cost / Connection	$264	$264	$264	$264	$264	$264	$264	$264			
Annual Cost	$0	$455,664	$28,776	$26,400	$26,400	$26,400	$26,400				
City of Tampa											
Accounts / Year	471	825	42	0	0	0	0	0			
Savings Rate (gpad)	81	81	81	81	81	81	81	81			
Annual Savings (mgd)	0.04	0.07	0.00	0.00	0.00	0.00	0.00	0.00	$ 0	0	0.00
Cumulative Savings (mgd)	0.04	0.07	0.07	0.07	0.07	0.07	0.07	0.07			
Cost / Connection	$0	$0	$0	$0	$0	$0	$0	$0			
Annual Cost	$0	$0	$0	$0	$0	$0	$0	$0			
Total Annual Savings (mgd)	0.04	0.21	0.01	0.01	0.01	0.01	0.01	0.00		266	
Total Cumulative Savings (mgd)	0.04	0.21	0.22	0.23	0.24	0.24	0.25	0.25			
Total Cost	$0	$455,664	$28,776	$26,400	$26,400	$26,400	$26,400	$0	$ 115,822		

* gpad - Gallons Per Account per Day
* gpud - - Gallons Per Unit per Day
* gpmd - - Gallons Per Measures per Day
* mgd - - Million Gallons per Day

Note: For detailed explanation of this BMP refer to "Potable Water Conservation Best Management Practices for the Tampa Bay Region" report.

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Table 17

BMP Template
Indoor
Non-Residential

The purpose of this BMP is to allow flexibility for a member government to create its own BMP or to combine two or more BMPs. This BMP is for indoor water use by a Non-Residential property.

	Historical Activity		Current Year	5 Year Plan 2016 - 2020					Total Scenario Cost	Total Water Savings (MG)	Scenario Cost Effectiveness ($/1000 gal.)
	Pre - 96	1996 - 2014	2015	2016	2017	2018	2019	2020			
Description: Hillsborough Pre-Rinse Sprayer Distribution - NR											
Hillsborough County Accounts / Year	0	14	25	25	25	25	25	25	$ 2,084	85	0.15
Savings Rate (gpad)	103	103	103	103	103	103	103	103			
Annual Savings (mgd)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
Cumulative Savings (mgd)	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.02			
Cost / Connection	$19	$19	$19	$19	$19	$19	$19	$19			
Annual Cost	$0	$266	$475	$475	$475	$475	$475	$475			
Description: Ici Pre-Rinse Spray Nozzle Program											
Pinellas County Accounts / Year	0	562	0	0	0	0	0	0	$ 0	0	0.00
Savings Rate (gpad)	137	137	137	137	137	137	137	137			
Annual Savings (mgd)	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00			
Cumulative Savings (mgd)	0.00	0.08	0.08	0.08	0.08	0.08	0.08	0.08			
Cost / Connection	$76	$76	$76	$76	$76	$76	$76	$76			
Annual Cost	$0	$42,712	$0	$0	$0	$0	$0	$0			
Description: ICI Pre Rinse Spray Valve Program 2015											
City of St. Petersburg Accounts / Year	0	345	5	5	5	5	5		$ 680	66	0.06
Savings Rate (gpad)	400	400	400	400	400	400	400	400			
Annual Savings (mgd)	0.00	0.14	0.00	0.00	0.00	0.00	0.00				
Cumulative Savings (mgd)	0.00	0.14	0.14	0.14	0.15	0.15	0.15				
Cost / Connection	$31	$31	$31	$31	$31	$31	$31	$31			
Annual Cost	$0	$10,695	$155	$155	$155	$155	$155				
Total Annual Savings (mgd)	0.00	0.22	0.00	0.00	0.00	0.00	0.00	0.00		150	
Total Cumulative Savings (mgd)	0.00	0.22	0.22	0.23	0.23	0.23	0.24	0.24			
Total Cost	$0	$53,673	$630	$630	$630	$630	$630	$475	$ 2,764		

* gpad - Gallons Per Account per Day
* gpud - - Gallons Per Unit per Day
* gpmd - - Gallons Per Measures per Day
* mgd - - Million Gallons per Day

Note: For detailed explanation of this BMP refer to "Potable Water Conservation Best Management Practices for the Tampa Bay Region" report.

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Tampa Bay Water

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Table 18

HET Toilet Program

Multi-Family

This program provides HET toilet bulk purchase / giveaway or rebates to Multi Family residences that replace high water-use toilets with HET toilets, which reduce the volume of water use to 1.28 gallons per flush (gpf). This results in significant water savings over older, less efficient toilets, which use from 3.5 to 7.0 gpf, depending on the age of the toilet.

	Historical Activity		Current Year	5 Year Plan 2016 - 2020					Total Scenario Cost	Total Water Savings (MG)	Scenario Cost Effectiveness ($/1000 gal.)
	Pre - 96	1996 - 2014	2015	2016	2017	2018	2019	2020			
Hillsborough County											
Accounts / Year	0	0	352	50	50	50	50	50			
Savings Rate (gpad)	22	22	22	22	22	22	22	22			
Annual Savings (mgd)	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	$ 21,059	36	0.58
Cumulative Savings (mgd)	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01			
Cost / Connection	$96	$96	$96	$96	$96	$96	$96	$96			
Annual Cost	$0	$0	$33,792	$4,800	$4,800	$4,800	$4,800	$4,800			
City of St. Petersburg											
Accounts / Year	0	288	70	70	70	70	70				
Savings Rate (gpad)	24	24	24	24	24	24	24	24			
Annual Savings (mgd)	0.00	0.01	0.00	0.00	0.00	0.00	0.00		$ 51,594	55	0.93
Cumulative Savings (mgd)	0.00	0.01	0.01	0.01	0.01	0.02	0.02				
Cost / Connection	$168	$168	$168	$168	$168	$168	$168	$168			
Annual Cost	$0	$48,384	$11,760	$11,760	$11,760	$11,760	$11,760				
Total Annual Savings (mgd)	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00		91	
Total Cumulative Savings (mgd)	0.00	0.01	0.02	0.02	0.02	0.02	0.03	0.03			
Total Cost	$0	$48,384	$45,552	$16,560	$16,560	$16,560	$16,560	$4,800	$ 72,652		

* gpad - Gallons Per Account per Day
* gpud - - Gallons Per Unit per Day
* gpmd - - Gallons Per Measures per Day
* mgd - - Million Gallons per Day

Note: For detailed explanation of this BMP refer to "Potable Water Conservation Best Management Practices for the Tampa Bay Region" report.

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Table 19

HET Toilet Program

Non-Residential

This program provides HET toilet bulk purchase / giveaway or rebates to Non-Residential properties that replace high water-use toilets with HET toilets, which reduce the volume of water use to 1.28 gallons per flush (gpf). This results in significant water savings over older, less efficient toilets, which use from 3.5 to 7.0 gpf, depending on the age of the toilet.

	Historical Activity		Current Year	5 Year Plan 2016 - 2020					Total Scenario Cost	Total Water Savings (MG)	Scenario Cost Effectiveness ($/1000 gal.)
	Pre - 96	1996 - 2014	2015	2016	2017	2018	2019	2020			
Hillsborough County											
Accounts / Year	0	0	0	5	5	5	5	5			
Savings Rate (gpmd)	35	35	35	35	35	35	35	35			
Annual Savings (mgd)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	$ 2,786	6	0.48
Cumulative Savings (mgd)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
Cost / Connection	$127	$127	$127	$127	$127	$127	$127	$127			
Annual Cost	$0	$0	$0	$635	$635	$635	$635	$635			
City of St. Petersburg											
Accounts / Year	0	104	30	30	30	30	30				
Savings Rate (gpmd)	41	41	41	41	41	41	41	41			
Annual Savings (mgd)	0.00	0.00	0.00	0.00	0.00	0.00	0.00		$ 22,112	40	0.55
Cumulative Savings (mgd)	0.00	0.00	0.01	0.01	0.01	0.01	0.01				
Cost / Connection	$168	$168	$168	$168	$168	$168	$168	$168			
Annual Cost	$0	$17,472	$5,040	$5,040	$5,040	$5,040	$5,040				
Total Annual Savings (mgd)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		46	
Total Cumulative Savings (mgd)	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01			
Total Cost	$0	$17,472	$5,040	$5,675	$5,675	$5,675	$5,675	$635	$ 24,897		

* gpad - Gallons Per Account per Day
* gpud - - Gallons Per Unit per Day
* gpmd - - Gallons Per Measures per Day
* mgd - - Million Gallons per Day

Note: For detailed explanation of this BMP refer to "Potable Water Conservation Best Management Practices for the Tampa Bay Region" report.

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Tampa Bay Water

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Table 20

HET Toilet Program

Single Family

This program provides HET toilet bulk purchase / giveaway or rebates to Single Family residences that replace high water-use toilets with HET toilets, which reduce the volume of water use to 1.28 gallons per flush (gpf). This results in significant water savings over older, less efficient toilets, which use from 3.5 to 7.0 gpf, depending on the age of the toilet.

	Historical Activity		Current Year	5 Year Plan 2016 - 2020					Total Scenario Cost	Total Water Savings (MG)	Scenario Cost Effectiveness ($/1000 gal.)
	Pre - 96	1996 - 2014	2015	2016	2017	2018	2019	2020			
Hillsborough County											
Accounts / Year	0	0	100	100	100	100	100	100			
Savings Rate (gpad)	32	32	32	32	32	32	32	32			
Annual Savings (mgd)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	$ 63,088	105	0.60
Cumulative Savings (mgd)	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.02			
Cost / Connection	$144	$144	$144	$144	$144	$144	$144	$144			
Annual Cost	$0	$0	$14,380	$14,380	$14,380	$14,380	$14,380	$14,380			
City of New Port Richey											
Accounts / Year	0	0	1	0	0	0	0	0			
Savings Rate (gpad)	32	32	32	32	32	32	32	32			
Annual Savings (mgd)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	$ 0	0	0.00
Cumulative Savings (mgd)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
Cost / Connection	$144	$144	$144	$144	$144	$144	$144	$144			
Annual Cost	$0	$0	$144	$0	$0	$0	$0	$0			
City of St. Petersburg											
Accounts / Year	0	689	400	400	400	400	400				
Savings Rate (gpad)	32	32	32	32	32	32	32	32			
Annual Savings (mgd)	0.00	0.02	0.01	0.01	0.01	0.01	0.01		$ 294,821	420	0.70
Cumulative Savings (mgd)	0.00	0.02	0.03	0.06	0.07	0.09	0.10				
Cost / Connection	$168	$168	$168	$168	$168	$168	$168	$168			
Annual Cost	$0	$115,752	$67,200	$67,200	$67,200	$67,200	$67,200				
Total Annual Savings (mgd)	0.00	0.02	0.02	0.02	0.02	0.02	0.02	0.00		526	
Total Cumulative Savings (mgd)	0.00	0.02	0.04	0.05	0.07	0.09	0.10	0.11			
Total Cost	$0	$115,752	$81,724	$81,580	$81,580	$81,580	$81,580	$14,380	$ 357,909		

* gpad - Gallons Per Account per Day
* gpud - - Gallons Per Unit per Day
* gpmd - - Gallons Per Measures per Day
* mgd - - Million Gallons per Day

Note: For detailed explanation of this BMP refer to "Potable Water Conservation Best Management Practices for the Tampa Bay Region" report.

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Table 21

ICI Water-Use Evaluations and Rebates
Evaluations w/ Rebates
Non-Residential

This program provides water-use evaluations to Industrial, Commercial and Institutional (ICI) water users for indoor water use only – and includes rebates.

	Historical Activity		Current Year	5 Year Plan 2016 - 2020					Total Scenario Cost	Total Water Savings (MG)	Scenario Cost Effectiveness ($/1000 gal.)
	Pre - 96	1996 - 2014	2015	2016	2017	2018	2019	2020			
Pinellas County											
Accounts / Year	0	4	0	0	0	0	0	0			
Savings Rate (gpad)	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500			
Annual Savings (mgd)	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	$ 0	0	0.00
Cumulative Savings (mgd)	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01			
Cost / Connection	$0	$0	$0	$0	$0	$0	$0	$0			
Annual Cost	$0	$0	$0	$0	$0	$0	$0	$0			
Total Annual Savings (mgd)	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00		0	
Total Cumulative Savings (mgd)	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01			
Total Cost	$0	$0	$0	$0	$0	$0	$0	$0	$ 0		

* gpad - Gallons Per Account per Day
* gpud - - Gallons Per Unit per Day
* gpmd - - Gallons Per Measures per Day
* mgd - - Million Gallons per Day

Note: For detailed explanation of this BMP refer to "Potable Water Conservation Best Management Practices for the Tampa Bay Region" report.

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Table 22

ICI Water-Use Evaluations and Rebates
Evaluations w/o Rebates
Non-Residential

This program provides water-use evaluations to Industrial, Commercial and Institutional (ICI) water users for indoor water use only. This program does not include rebates.

	Historical Activity		Current Year	5 Year Plan 2016 - 2020					Total Scenario Cost	Total Water Savings (MG)	Scenario Cost Effectiveness ($/1000 gal.)
	Pre - 96	1996 - 2014	2015	2016	2017	2018	2019	2020			
Pinellas County											
Accounts / Year	0	151	0	0	0	0	0	0			
Savings Rate (gpad)	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000			
Annual Savings (mgd)	0.00	0.15	0.00	0.00	0.00	0.00	0.00	0.00	$ 0	0	0.00
Cumulative Savings (mgd)	0.00	0.15	0.15	0.15	0.15	0.15	0.15	0.15			
Cost / Connection	$0	$0	$0	$0	$0	$0	$0	$0			
Annual Cost	$0	$0	$0	$0	$0	$0	$0	$0			
City of St. Petersburg											
Accounts / Year	0	134	10	10	10	10	10				
Savings Rate (gpad)	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000			
Annual Savings (mgd)	0.00	0.13	0.01	0.01	0.01	0.01	0.01		$ 5,879	329	0.02
Cumulative Savings (mgd)	0.00	0.13	0.14	0.16	0.17	0.18	0.19				
Cost / Connection	$134	$134	$134	$134	$134	$134	$134	$134			
Annual Cost	$0	$17,956	$1,340	$1,340	$1,340	$1,340	$1,340				
Total Annual Savings (mgd)	0.00	0.29	0.01	0.01	0.01	0.01	0.01	0.00		329	
Total Cumulative Savings (mgd)	0.00	0.29	0.30	0.31	0.32	0.33	0.34	0.34			
Total Cost	$0	$17,956	$1,340	$1,340	$1,340	$1,340	$1,340	$0	$ 5,879		

* gpad - Gallons Per Account per Day
* gpud - - Gallons Per Unit per Day
* gpmd - - Gallons Per Measures per Day
* mgd - - Million Gallons per Day

Note: For detailed explanation of this BMP refer to "Potable Water Conservation Best Management Practices for the Tampa Bay Region" report.

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Tampa Bay Water

Regional Report

Table 23

ULF Toilet Program

Multi-Family

This program provides ULF toilet bulk purchase / giveaway or rebates to multi-family residences that replace high water-use toilets with ULF toilets, which reduce the volume of water use to 1.6 gallons per flush (gpf). This results in significant water savings over older, less efficient toilets, which use from 3.5 to 7.0 gpf, depending on the age of the toilet.

	Historical Activity		Current Year	5 Year Plan 2016 - 2020					Total Scenario Cost	Total Water Savings (MG)	Scenario Cost Effectiveness ($/1000 gal.)
	Pre - 96	1996 - 2014	2015	2016	2017	2018	2019	2020			
Hillsborough County											
Accounts / Year	176	8,160	5	50	50	50	50	50			
Savings Rate (gpud)	22	22	22	22	22	22	22	22			
Annual Savings (mgd)	0.00	0.18	0.00	0.00	0.00	0.00	0.00	0.00	$ 21,059	36	0.58
Cumulative Savings (mgd)	0.00	0.18	0.18	0.18	0.18	0.18	0.18	0.19			
Cost / Connection	$96	$96	$96	$96	$96	$96	$96	$96			
Annual Cost	$16,896	$783,360	$480	$4,800	$4,800	$4,800	$4,800	$4,800			
Pinellas County											
Accounts / Year	0	10,496	0	0	0	0	0	0			
Savings Rate (gpud)	20	20	20	20	20	20	20	20			
Annual Savings (mgd)	0.00	0.21	0.00	0.00	0.00	0.00	0.00	0.00	$ 0	0	0.00
Cumulative Savings (mgd)	0.00	0.21	0.21	0.21	0.21	0.21	0.21	0.21			
Cost / Connection	$193	$193	$193	$193	$193	$193	$193	$193			
Annual Cost	$0	$2,025,728	$0	$0	$0	$0	$0	$0			
City of St. Petersburg											
Accounts / Year	0	7,431	0	0	0	0	0	0			
Savings Rate (gpud)	22	22	22	22	22	22	22	22			
Annual Savings (mgd)	0.00	0.16	0.00	0.00	0.00	0.00	0.00	0.00	$ 0	0	0.00
Cumulative Savings (mgd)	0.00	0.16	0.16	0.16	0.16	0.16	0.16	0.16			
Cost / Connection	$96	$96	$96	$96	$96	$96	$96	$96			
Annual Cost	$0	$713,376	$0	$0	$0	$0	$0	$0			
City of Tampa											
Accounts / Year	800	13,183	0	0	0	0	0	0			
Savings Rate (gpud)	22	22	22	22	22	22	22	22			
Annual Savings (mgd)	0.02	0.29	0.00	0.00	0.00	0.00	0.00	0.00	$ 0	0	0.00
Cumulative Savings (mgd)	0.02	0.29	0.29	0.29	0.29	0.29	0.29	0.29			
Cost / Connection	$96	$96	$96	$96	$96	$96	$96	$96			
Annual Cost	$76,800	$1,265,568	$0	$0	$0	$0	$0	$0			
Total Annual Savings (mgd)	0.02	0.84	0.00	0.00	0.00	0.00	0.00	0.00		36	
Total Cumulative Savings (mgd)	0.02	0.84	0.84	0.84	0.85	0.85	0.85	0.85			
Total Cost	$93,696	$4,788,032	$480	$4,800	$4,800	$4,800	$4,800	$4,800	$ 21,059		

* gpad - Gallons Per Account per Day
* gpud - - Gallons Per Unit per Day
* gpmd - - Gallons Per Measures per Day
* mgd - - Million Gallons per Day

Note: For detailed explanation of this BMP refer to "Potable Water Conservation Best Management Practices for the Tampa Bay Region" report.

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Tampa Bay Water

Regional Report

Table 24

ULF Toilet Program

Non-Residential

This program provides ULF toilet bulk purchase / giveaway or rebates to non-residential properties that replace high water-use toilets with ULF toilets, which reduce the volume of water use to 1.6 gallons per flush (gpf). This results in significant water savings over older, less efficient toilets, which use from 3.5 to 7.0 gpf, depending on the age of the toilet.

	Historical Activity		Current Year	5 Year Plan 2016 - 2020					Total Scenario Cost	Total Water Savings (MG)	Scenario Cost Effectiveness ($/1000 gal.)
	Pre - 96	1996 - 2014	2015	2016	2017	2018	2019	2020			
Hillsborough County											
Accounts / Year	75	2,101	0	5	5	5	5	5			
Savings Rate (gpmd)	49	49	49	49	49	49	49	49			
Annual Savings (mgd)	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	$ 2,786	8	0.35
Cumulative Savings (mgd)	0.00	0.10	0.10	0.10	0.10	0.10	0.10	0.10			
Cost / Connection	$127	$127	$127	$127	$127	$127	$127	$127			
Annual Cost	$9,525	$266,827	$0	$635	$635	$635	$635	$635			
Pinellas County											
Accounts / Year	0	8,818	0	0	0	0	0	0			
Savings Rate (gpmd)	49	49	49	49	49	49	49	49			
Annual Savings (mgd)	0.00	0.43	0.00	0.00	0.00	0.00	0.00	0.00	$ 0	0	0.00
Cumulative Savings (mgd)	0.00	0.43	0.43	0.43	0.43	0.43	0.43	0.43			
Cost / Connection	$145	$145	$145	$145	$145	$145	$145	$145			
Annual Cost	$0	$1,278,610	$0	$0	$0	$0	$0	$0			
City of St. Petersburg											
Accounts / Year	0	515	20	0	0	0	0				
Savings Rate (gpmd)	49	49	49	49	49	49	49	49			
Annual Savings (mgd)	0.00	0.03	0.00	0.00	0.00	0.00	0.00		$ 3,360	7	0.47
Cumulative Savings (mgd)	0.00	0.03	0.03	0.03	0.03	0.03	0.03				
Cost / Connection	$168	$168	$168	$168	$168	$168	$168	$168			
Annual Cost	$0	$86,520	$3,360	$0	$0	$0	$0				
City of Tampa											
Accounts / Year	0	481	0	0	0	0	0	0			
Savings Rate (gpmd)	49	49	49	49	49	49	49	49			
Annual Savings (mgd)	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	$ 0	0	0.00
Cumulative Savings (mgd)	0.00	0.02	0.02	0.02	0.02	0.02	0.02	0.02			
Cost / Connection	$127	$127	$127	$127	$127	$127	$127	$127			
Annual Cost	$0	$61,087	$0	$0	$0	$0	$0	$0			
Total Annual Savings (mgd)	0.00	0.58	0.00	0.00	0.00	0.00	0.00	0.00		15	
Total Cumulative Savings (mgd)	0.00	0.58	0.58	0.59	0.59	0.59	0.59	0.59			
Total Cost	$9,525	$1,693,044	$3,360	$635	$635	$635	$635	$635	$ 6,146		

* gpad - Gallons Per Account per Day
* gpud - - Gallons Per Unit per Day
* gpmd - - Gallons Per Measures per Day
* mgd - - Million Gallons per Day

Note: For detailed explanation of this BMP refer to "Potable Water Conservation Best Management Practices for the Tampa Bay Region" report.

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Table 25

ULF Toilet Program

Single Family

This program provides ULF toilet bulk purchase / giveaway or rebates to single-family residences that replace high water-use toilets with ULF toilets, which reduce the volume of water use to 1.6 gallons per flush (gpf). This results in significant water savings over older, less efficient toilets, which use from 3.5 to 7.0 gpf, depending on the age of the toilet.

	Historical Activity		Current Year	5 Year Plan 2016 - 2020					Total Scenario Cost	Total Water Savings (MG)	Scenario Cost Effectiveness ($/1000 gal.)
	Pre - 96	1996 - 2014	2015	2016	2017	2018	2019	2020			
Hillsborough County											
Accounts / Year	4,427	42,404	231	230	230	230	230	230			
Savings Rate (gpad)	27	27	27	27	27	27	27	27			
Annual Savings (mgd)	0.12	1.13	0.01	0.01	0.01	0.01	0.01	0.01	$ 145,103	201	0.72
Cumulative Savings (mgd)	0.12	1.13	1.13	1.14	1.15	1.15	1.16	1.16			
Cost / Connection	$144	$144	$144	$144	$144	$144	$144	$144			
Annual Cost	$636,603	$6,097,695	$33,218	$33,074	$33,074	$33,074	$33,074	$33,074			
Pasco County											
Accounts / Year	0	2,299	1,120	1,000	1,000	1,000	1,000	1,000			
Savings Rate (gpad)	27	27	27	27	27	27	27	27			
Annual Savings (mgd)	0.00	0.06	0.03	0.03	0.03	0.03	0.03	0.03	$ 630,881	874	0.72
Cumulative Savings (mgd)	0.00	0.06	0.09	0.12	0.14	0.17	0.20	0.22			
Cost / Connection	$144	$144	$144	$144	$144	$144	$144	$144			
Annual Cost	$0	$330,596	$161,056	$143,800	$143,800	$143,800	$143,800	$143,800			
Pinellas County											
Accounts / Year	0	61,210	0	0	0	0	0	0			
Savings Rate (gpad)	27	27	27	27	27	27	27	27			
Annual Savings (mgd)	0.00	1.63	0.00	0.00	0.00	0.00	0.00	0.00	$ 0	0	0.00
Cumulative Savings (mgd)	0.00	1.63	1.63	1.63	1.63	1.63	1.63	1.63			
Cost / Connection	$197	$197	$197	$197	$197	$197	$197	$197			
Annual Cost	$0	$12,058,370	$0	$0	$0	$0	$0	$0			
City of St. Petersburg											
Accounts / Year	0	19,259	0	0	0	0	0	0			
Savings Rate (gpad)	27	27	27	27	27	27	27	27			
Annual Savings (mgd)	0.00	0.51	0.00	0.00	0.00	0.00	0.00	0.00	$ 0	0	0.00
Cumulative Savings (mgd)	0.00	0.51	0.51	0.51	0.51	0.51	0.51	0.51			
Cost / Connection	$144	$144	$144	$144	$144	$144	$144	$144			
Annual Cost	$0	$2,769,444	$0	$0	$0	$0	$0	$0			
City of Tampa											
Accounts / Year	5,120	9,444	0	0	0	0	0	0			
Savings Rate (gpad)	27	27	27	27	27	27	27	27			
Annual Savings (mgd)	0.14	0.25	0.00	0.00	0.00	0.00	0.00	0.00	$ 0	0	0.00
Cumulative Savings (mgd)	0.14	0.25	0.25	0.25	0.25	0.25	0.25	0.25			
Cost / Connection	$144	$144	$144	$144	$144	$144	$144	$144			
Annual Cost	$736,256	$1,358,047	$0	$0	$0	$0	$0	$0			
Total Annual Savings (mgd)	0.25	3.58	0.04	0.03	0.03	0.03	0.03	0.03		1,075	
Total Cumulative Savings (mgd)	0.25	3.58	3.62	3.65	3.68	3.71	3.75	3.78			
Total Cost	$1,372,859	$22,614,153	$194,274	$176,874	$176,874	$176,874	$176,874	$176,874	$ 775,984		

* gpad - Gallons Per Account per Day
* gpud - - Gallons Per Unit per Day
* gpmd - - Gallons Per Measures per Day
* mgd - - Million Gallons per Day

Note: For detailed explanation of this BMP refer to "Potable Water Conservation Best Management Practices for the Tampa Bay Region" report.

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Appendix F

Greenhouse Gas Emissions Associated with Water Production

Appendix F

Greenhouse Gas Emissions Associated with Water Production

Greenhouse Gas Emissions Associated with Water Production – Tampa Bay Water

January 2016

Background:

Greenhouse gases (GHG's) are gases that affect the distribution and amount of heat in the atmosphere. These gases include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and fluorinated gases (hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride (SF_6)). These compounds occur naturally, but emissions of these gases increase due to human activities.[1] Human activities can also artificially increase the concentrations of these gases in the atmosphere. The most common method of increasing the GHG concentrations is through the combustion of fossil fuels for the production of electricity and heat.

Greenhouse gases emitted by electric companies include CO_2, CH_4 and N_2O, and members of the nitrogen oxide family (NO_x). These gases can remain in the atmosphere for many years. The atmospheric lifetime of these gases vary with CO_2 ranging from 50-200 years, N_2O lasting approximately 114 years, and CH_4 lasting about 12 years.[2] These gases are responsible not only for harmful effects on climate, but also on human health.

An effective way to measure the effects of these GHG's is to examine the Global Warming Potential which compares the ability of each greenhouse gas to trap heat in the atmosphere relative to another gas. While CO_2 is a predominant greenhouse gas in the atmosphere and often the focus of greenhouse-gas emissions discussions, CH_4 and, particularly, N_2O emissions have far more powerful heat trapping capabilities. According to the U.S. Environmental Protection Agency (EPA), CH_4 is approximately "25 times more powerful at warming the atmosphere than CO_2 by weight," and N_2O is "300 times more powerful-than CO_2 on a per molecule basis" over a 100-year time period.[3]

In 2007, Florida's previous gubernatorial administration issued three Executive Orders (07-126, 07-127 and 07-128) to address climate change: these executive orders called for the reduction of greenhouse gas emissions; however, these Orders are no longer enforced (details can be found in the Appendix).

More significantly the U.S. EPA established the Clean Power Plan in August of 2015, with the goal of reducing carbon pollution emitted by existing power plants 32% from 2005 levels as well as increasing energy

[1]See http://www.epa.gov/climatechange/ghgemissions/index.html
[2] See http://epa.gov/climatechange/ghgemissions/gases.html
[3]See http://epa.gov/climatechange/ghgemissions/gases/ch4.html and http://epa.gov/climatechange/ghgemissions/gases/n2o.html

BACK

derived from alternative sources 30%, by the year 2030. Once enacted, this could greatly reduce GHG emissions from power plants currently providing electricity to the Tampa Bay region.

The 2009-2012 Scorecard showed a marked reduction (-109,387 metric tons) in the overall GHG emissions from state agencies compared to previous baseline years (06-07). This reduction was theorized to be the result of several factors, including increased water efficiency in government agencies. This data, along with encouragement from state environmental organizations, spurred Tampa Bay Water to develop a greenhouse gas emission and reduction methodology, described below in detail, that quantifies emissions associated with regional water production and associated reductions caused by active conservation programs implemented in the region by the agency's Member Governments. Calculation of such data is important in demonstrating a secondary benefit from reduced water use within the Bay Area: a decrease in the greenhouse gases detrimental to human and environmental health.

Energy Associated with Water Production

The Congressional Research Service estimates that about 12.6 percent of the nation's energy demand is used to treat, pump, and heat water.[4] On the water supply side, pumping water is the main consumer of energy; this includes pumping untreated water to treatment plants and delivery of treated water to customers. For every step in supplying water, kilowatts of electricity are used. Therefore, a reduction in water use saves energy because less water needs to be pumped and treated.

Tampa Bay Water developed a methodology to calculate the GHG emissions associated with the energy use in water production. This methodology relies on data collected from its' Energy Consumption Manager. This is an Enterprise Data Management System database for energy consumption, which Tampa Bay Water developed with in-house resources. The System integrates commercial power billing data from the Agency's three commercial power providers and operating data (e.g. flow rate, equipment run time, energy use, among others) from the Agency's supervisory control and data acquisition systems for all Agency facilities. The fossil fuel mix for each utility was researched and was determined based on various EPA data and the contacts available at the electric utilities.

The EPA emissions data, along with data gathered from Tampa Bay Water for WY 2015, including electrical usage associated with pumping water and the amount of water pumped and produced, are used to find

[4] Copeland, Claudia. Energy-Water-Nexus: The Water Sector's Energy Use. Congressional Research Service. January 3, 2014. https://www.fas.org/sgp/crs/misc/R43200.pdf. Page 3.

the total calculations included in this report. This compilation of data is used to show possible emissions reductions through reduced water demand and reduced electrical usage.

Method:

Tampa Bay Water quantifies emissions from power production used to pump water to its member governments for their distribution. This methodology allows member governments to see the relationship between reduced water demand (conserved water), reduced electric use by Tampa Bay Water, and how this will result in reductions of GHG emissions.[5]

The data for the methodology comes from Tampa Bay Water's electrical usage from the pumping facilities during Water Year WY 2015 (October 2014-September 2015). This data is retrieved from the Agency's Energy Consumption Manager Application.

The data listed above is used in conjunction with the EPA's emissions data (Table 3) obtained from the Clean Energy eGrid website at http://www.epa.gov/cleanenergy/energy-resources/egrid/ along with the EPA's Air Markets Program data (AMPD) ; http://ampd.epa.gov/ampd/ . As of August 2015, the most current emissions data available for regional power plants on the EPA's Clean Energy eGrid website was for the calendar year 2012[6]. The AMPD data provides the most up to date emission data as clarified by the EPA; however, this data only provides emissions data for CO_2, SO_2, CH_4 and NO_x (rather than N_2O). These three sources are utilized to make a comparison of the previous emissions data with the current emissions data.

The emissions data from the EPA is converted to pounds (lbs) (Table 4) and totaled for each energy source while the total megawatt-hour (MWh) produced are converted to kWh and used with the total emissions to find emission lbs per kWh (Table 4). The emissions in pounds per kWh for each energy source are multiplied by Tampa Bay Water's kWh used per year to determine total annual greenhouse gas emissions associated with Tampa Bay Water, water delivery (Table 5). The pounds per kWh of emissions are multiplied by the kWh per MG produced to find emissions per MG produced in pounds. These steps are replicated for each emission type and for each source of energy.

To determine the GHG emissions reductions from conserved water, data regarding amount of water saved is collected from the member governments five year conservation plans. MG saved is then multiplied by CO_2, N_2O, and CH_4 (lbs/mg), then each value is multiplied by 365 days to determine the total emissions

[5] Additionally, new, cleaner technologies employed at regional power plants will also result in a reduction in greenhouse gas emissions into the atmosphere.
[6] See http://www.epa.gov/cleanenergy/energy-resources/egrid/index.html

reductions for MG saved (tons)/year (Table 6). The total emissions reduction for MG saved in tons/year is converted from its measurement in short tons to metric tons. This value is then divided by 4.8 metric tons CO_2E/vehicle/year, the EPA's calculation for the amount of CO_2 emissions emitted per passenger car per year. The emissions (in tons) saved through reduced water use are entered into the EPA's Greenhouse Gas Equivalencies Calculator (www.epa.gov/cleanenergy/energy-resources/calculator.html) to find equivalent amount of emissions produced by motor vehicles. This information is listed in the Results section of this document.

Emissions Associated with Residential Hot Water Use

In addition to calculating greenhouse gas emissions associated with producing water, Tampa Bay Water calculated the carbon dioxide, methane and nitrous oxide emissions produced from typical single-family (SF) residential hot water use. These calculations are used to illustrate; by reducing hot water use, energy savings can result in a reduction in greenhouse gas emissions.

To determine greenhouse gas emissions produced by residential hot water use; the estimated percentage of hot water required per indoor water use category is gathered along with the energy intensity (in kilowatt hour per million gallons (kWh/MG)) associated with that category.[7] Hot water categories include; baths and showers, plus hot water used in clothes washers, dishwashers, and faucets.

The indoor gallon per capita per day (gpcd) is calculated for each hot water category. This information is obtained from the *Residential End Uses of Water Study Update* by DeOreo et al.[8] The indoor gpcd for each category is then multiplied by the average persons per SF household (or account) in the region to estimate water use by type per SF account. The result is multiplied by the percentage of hot water used to find total hot water use per SF account (in gallons).

Next, the energy intensity measured in kWh/MG for each hot water category is calculated from the *Residential End Uses of Water Study Update* by DeOreo et al.[9] and each were divided by 1,000,000 to find kilowatt hour per gallon (kWh/gal). KWh/gal for each hot water category is multiplied by a ratio accounting for the adjustment in water temperature difference between the average determined in the DeOreo et al. study and that occurring in the Tampa Bay region.[10]

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[7] DeOreo, B., Mayer, P., Dziegielewski, B., Kiefer, J. Residential End Uses of Water Study Update. Water Research Foundation. Denver, CO. 2014. Page 193.
[8] DeOreo et al. *Residential End Uses of Water Study Update*. 193.
[9] DeOreo et al. *Residential End Uses of Water Study Update*. 193.
[10] The REUS2 study uses an average increase in temperature of 62ºF. Tampa Bay Water uses an increase of 35ºF.

The total hot water used per SF account for each hot water category is multiplied by kWh/gal (which includes the adjustment for temperature) to find kWh used per average SF account / hot water use type. The numbers obtained for each hot water use category are then multiplied by the respective percentage of hot water use in overall water use to find CO_2, CH_4, and N_2O lbs emitted per hot water use/type per day (see Table 7).

Emissions Associated with Commercial Pre-rinse Spray Valves

Replacing standard pre-rinse spray valves (average 3.0 gallons per minute or gpm) with more efficient valves (1.28 gpm or less) can reduce water use, plus save on the electricity or natural gas associated with heating water. Since heating water is extremely energy intensive, a savings in energy through reduced hot water use will result in a reduction in greenhouse gas emissions. (The EPA WaterSense program currently labels pre-rinse spray valves that use 1.28 gpm or less, which greatly reduce water and electrical usage for commercial and institutional entities)[11].

Tampa Bay Water developed a methodology for calculating the amount of greenhouse gas emissions produced by using standard pre-rinse spray valves and emissions reductions occurring by switching to more efficient spray valves. A standard pre-rinse spray valve uses approximately 2.92 gpm and is used for an average of 40 minutes per day;[12] totaling approximately 116 gallons of water used per spray valve per day. Efficient spray valves, for the purpose of this report, were estimated to use 1.28 gpm.[13] Efficient pre-rinse spray valves have been found to operate for slightly longer periods than their standard counterparts, averaging 55 minutes of use per day.[14] This amounts to an average of 74 gallons of water used per valve per day for efficient valves. The percentage of hot water used per spray valve for both standard and efficient valves was assumed to be 100%.[15]

For this report, total water use per valve per day for both standard and efficient valves is multiplied by kWh/gal. To obtain the kWh/gal calculation; energy intensity in kWh/MG is from DeOreo et al.'s *Residential End Uses of Water Study Update*[16] and divided by one million to find kWh/gal. The outcome is multiplied by the ratio 35/62 to create the adjustment needed to account for temperature difference between water supplied by Tampa Bay Water and average water supply temperatures used in the *REUS2* study. Total water use per valve per day (in gal) is multiplied by kWh/gal (i.e., includes adjustment for temperature) to find kWh used per valve

[11] http://www.epa.gov/WaterSense/products/prsv.html
[12] Tso, B. Pre-Rinse Spray Valve Programs: How are they really doing? SBW Consulting, Inc. 2005.
[13] Tso. *Pre-Rinse Spray Valve Programs*. 2005.
[14] Tso. *Pre-Rinse Spray Valve Programs*. 2005.
[15] Region of Waterloo Pre-Rinse Spray Valve Pilot Study Final Report by Veritec Consulting, Inc. 2005.
[16] DeOreo et al. *Residential End Uses of Water Study Update*. 193.

per day. KWh used per valve per day is then multiplied by CO_2 lbs per kWh to find CO_2 lbs emitted per valve per day. CO_2 lbs per kWh are calculated using calendar year 2015 U.S. EPA air pollutant emissions from Tampa Bay area power stations. KWh used per valve per day is multiplied by CH_4 and N_2O lbs per kWh to find emissions in lbs per valve per day (Table 8). Data for calculating CH_4 and N_2O come from calendar year 2012 EPA eGrid data.[17]

Three member governments served by Tampa Bay Water have existing pre-rinse spray valve rebate programs: Pinellas County, Hillsborough County and the City of St. Petersburg. The total number of pre-rinse spray valve replacements provided by each member government between the years 1996-2015 is multiplied by the daily savings rate determined by each member government based on previous area studies. This produces the total gallons saved per day per each member government's pre-rinse spray valve program, and is multiplied by kWh/gal, which includes the adjustment for water temperature difference between Tampa Bay Water and the average found in the *Residential End Uses* study. This gives the total kWh saved per day per reduced water use, which is then multiplied by each GHG emissions type (CO_2, CH_4 and N_2O) to determine lbs of emissions saved per day through reduced water use. Emissions (in lbs) are divided by the total gallons saved per day to find the emissions (in lbs) saved per gallon of water saved. Total emissions (in lbs) saved per day are then multiplied by 365 days to determine the total emissions (in lbs) saved per year.

Results:

It was determined that a savings of 24.69 MGD for WY 2015 resulted in a total CO_2 reduction of 20,535 tons per year, a total CH_4 reduction of 480 lbs/year, and a total N_2O reduction of 518 lbs/year. Included in these emissions reductions are 2,209,451 lbs of CO_2, approximately 27 lbs of CH_4, and 29 lbs of N_2O emissions that were avoided as a result of conserved water through Pinellas County, Hillsborough County and St. Petersburg's pre-rinse spray valve rebate program. As an example, combined these water conservation-related emissions reductions are equivalent to removing approximately 4,296 passenger cars from the road for one year.[18]

[17] http://www.epa.gov/cleanenergy/energy-resources/egrid/

[18] According to the U.S. EPA, passenger cars emit 4.8 metric tons of CO_2E/vehicle/year. See http://www.epa.gov/cleanenergy/energy-resources/calculator.html

Emissions Report Calculations:

Note: 1MWh =1000 kWh

1 ton (short) = 2000 lbs

Table 1 – WY 2015 Electrical Annual Totals for Tampa Bay Water.

WY 2015 Facilities Electrical Annual Totals

Location	MGY Pumped	KWh/MG (pumped)	MGY Produced	kWh/MG Produced
Progress Energy	10,169.28	398.53	5,983.26	677.36
TECO	132,574.75	856.36	39,006.95	2,910.55
WREC	609,578.60	27.67	14,893.30	1,132.62
Total	**752,322.63**	**178.72**	**59,883.51**	**2,245.24**

Source: Data based on Tampa Bay Water records:
Note: MGY = million gallons per year

Table 2 – WY 2015 Calculations for Tampa Bay Water.

Location	Gallons Pumped/Gallons Produced	Average MGD Produced	kWh/Day Used	kWh/Year Used
Progress Energy	1.70	16.39	11,103.57	4,052,803.00
TECO	19.29	106.87	311,045.95	113,531,773.00
WREC	40.93	40.80	46,214.73	16,868,377.00
Total	**12.56**	**164.06**	**368,364.25**	**134,452,953.00**

- **Identify kWh/million gallons (MG) produced:**

For each specific electric source (i.e. a separate calculation for TECO, Progress Energy, & WREC) calculate:

- kWh/MG produced = kWh/MG pumped * gallons pumped /gallons produced

Progress Energy

_____kWh/MG produced = ____kWh/MG pumped * gallons pumped/gallons produced

TECO

_____kWh/MG produced = _____kWh/MG pumped * gallons pump

WREC

_____kWh/MG Produced = _____kWh/MG Pumped * gallons pumped/gallons produced

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Table 3 –Emissions Data from Tampa Bay Area Power Stations.

EPA Air Pollutant Emissions from Tampa Bay Area Power Stations					
Location	Annual Gross load* megawatt hours (MWh) used (2015 AMPD Data)	Annual **CO_2 tons** (2015 AMPD Data)	Annual Net Generation **(MWh)** (2012 eGrid data)	Annual **CO_2 tons***** (2012 eGrid data)	Annual **N_2O lbs** (2012 eGrid data)
Hillsborough County					
Big Bend Power Station (TECO)	7,937,085.00	8,463,633.60	9,044,806.00	11,018,245.30	373,880.10
H.L. Culbreath Bayside Power Station (TECO)	3,759,458.00	2,487,065.30	8,345,303.60	3,668,412.20	14,382.70
Pinellas County					
P.L. Bartow (PE)	5,386,885.00	2,444,221.80	7,034,843.00	3,159,219.30	12,467.9
Pasco County					
Anclote (PE)	1,933,555.00	1,199,343.90	1,887,407.00	1,631,432.00	19,553.40
Putnam County					
Seminole Electric Co-op 136 (WREC)	6,868,246.00	6,072,885.60	8,929,519.00	9,366,894.90	318,529.10
Hardee County					
Hardee Power Station (WREC)	216,143.00	737.40	551,795.00	285,196.90	1,133.70

NOTE: This table is the baseline data for the Emissions tables in this document. All conversions are based on this table and the conversion factors above.

*N_2O and CH_4 emissions data, along with annual net generation MWh, come from the EPA's Clean Energy eGrid website. As of December, 2019, the most current N_2O and CH_4 data available on the eGrid website was for calendar year 2012.

**CO_2 emissions data and annual gross load MWh come from the EPA's Clean Air Markets website. These data are based on calendar year 2015.

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Table 4 –Emissions from Tampa Bay Area Power Stations.

Location	**CO_2 lbs/kWh** (2015 AMPD Data)	**SO2 lbs/kWh** (2015 AMPD Data)	**N_2O lbs/kWh** (2012 eGrid Data)
Hillsborough County			
Big Bend Power Station (TECO)	2.132681	0.002110	0.000041
H.L. Culbreath Bayside (TECO)	1.323098	0.000007	0.000002
TECO Total	**1.872468**	**0.001434**	**0.000022**
Pinellas County			
P.L. Bartow (Progress Energy)	0.907471	0.000005	0.000002
Pasco County			
Anclote (Progress Energy)	1.240558	0.000006	0.000010
Progress Energy Total	**0.995450**	**0.000005**	**0.000004**
Putnam County			
Seminole Electric Co-op	1.768395	0.002933	0.000036
Hardee County			
Hardee Power Station (WREC)	0.006823	0.000008	0.000002
Withlacoochee River Electric Cooperative (WREC)*	**1.714650**	**0.002843**	**0.000034**

For each electric source, the total emissions (lbs) are divided by kWh to produce Emission lbs/kWh, which can be used to calculate emissions by electric source. Emissions are then averaged based on the percentage of total electric production from each facility.

Table 5 – Emissions from Water Produced in WY2015.

Location	CO2 lbs/kWh	N2O lbs/kWh	CH4 lbs/kWh	CO2 lbs/year	N2O lbs/year	CH4 lbs/year	CO2 lbs/per MG	N2O lbs/per MG	CH4 lbs/per MG
Progress Energy	0.995449918	0.000004	0.000026	4,034,362.415	14.54521233	107.1413532	727.390772	0.002430985	0.017906852
TECO	1.872468	0.000022	0.000023	212,584,566.5	2534.783569	2570.813848	4916.160693	0.06498287	0.019391429
WREC	1.714650	0.000034	0.000024	28,923,358.82	568.7178616	397.935693	2306.031688	0.038186155	0.026719108
Total				245,542,287.7	3118.046643	3075.890894	3848.488911	0.052068535	0.051364573

- **Calculate lbs of Pollutant Per Year**

kWh/MG produced * average MGD produced = kWh/day

kWh/day * 365 days/year = kWh/year

kWh/year * x lbs CH_4/kWh = x lbs CH_4/year

kWh/year * x lbs N_2O/kWh = x lbs N_2O/year

kWh/year * x lbs CO_2/kWh = x lbs CO_2/year

- **Calculate lbs of pollutant per MG**

(lbs/year / 365 days)/average MGD produced

Table 6 – Reductions in Greenhouse Gas Emissions Due to Conserved Water.

Calendar Year 2015 Emissions Data and WY 2015 Water Savings											
	MGD Saved	CH_4 (lbs/mg)	N_2O (lbs/mg)	CO_2 (lbs/mg)	Total CH_4 reduction for MG saved (lbs)/yr	Total N_2O reduction for MG saved (lbs)/yr	Total CO_2 reduction for MG saved (lbs)/yr	Total CO_2 reduction for MG Saved (tons)/yr	Total CH_4 reduction for MG saved (tons)/yr	Total N_2O reduction for MG saved (tons)/yr	Total CO_2 reduction for MG saved (tons)/yr
Total	**26.28**	**0.05**	**0.0521**	**4,312.16**	**492.70**	**499.45**	**41,363,074.33**	**20,681.54**	**0.2463**	**0.2497**	**20,681.54**

Table 7 –Estimated Hot Water Requirements, Energy Intensity, and Greenhouse Gas Emissions for Residential Hot Water Use.

Water Use Category	% of Hot Water*	Energy Intensity kWh/MG	Indoor Per Capita Water Use (gcd)**	Average Persons/ SF Acct in Region	Water Use/type per SF Acct in Region (in gal)	Total hot water use/SF Acct (in gal)	kWh per gal (using energy intensity from the REUS2 study	kWh per gal***	kWh used per average SF Acct/hot water use type	CH_4 lbs emitted/hot water use type/day	N_2O lbs emitted/hot water use type/day	CO_2 lbs emitted/ hot water use type/day
Bath	59%	90,887	1.6	2.7	4.32	2.5	0.09	0.05	0.13	0.000003	0.000003	0.224151
Clothes Washer	20%	154,045	8.2	2.7	22.14	4.4	0.15	0.09	0.39	0.000009	0.000009	0.660022
Dishwasher	100%	80,524	0.9	2.7	2.43	1.3	0.08	0.05	0.06	0.000001	0.000001	0.097395
Faucet	57%	538,808	10	2.7	27	15.4	0.54	0.30	4.68	0.000107	0.000109	8.023727
Shower	66%	621,573	10	2.7	27	17.8	0.62	0.35	6.25	0.000143	0.000145	10.717743

*Data source for percentage of hot water and energy intensity for water use category: 2014. DeOreo W., Mayer P., Dziegielewski B., Kiefer J. Residential End Uses of Water Study Update. Water Research Foundation. Page 193.

**Data Source for indoor per capita water use: 2014. DeOreo W., Mayer P., Dziegielewski B., Kiefer J. Residential End Uses of Water Study Update. Water Research Foundation. Page 193.

*** The Residential End Uses Study Update found that, on average, water is heated by 62 degrees Fahrenheit for typical hot water use. The same study reveals that Toho, FL heats their hot water by an average of only 35 degrees F. We use 35/62 multiplied by the energy intensity for the adjustment in water temperature. Efficiency water heater 90% (high efficiency means the number is conservative). Max efficiency of water heaters 96%.

Note: Calculations for kWh per gal and kWh per avg. SF acct/hot water type are based on kWh used by Tampa Bay Water to produce water in WY 2015. Calculations to determine CO_2 emissions from hot water use are based on data from the EPA's Clean Air Maps website for calendar year 2015. CH_4 and N_2O emissions per hot water use type per day are based on data from the EPA's eGrid website for calendar year 2012.

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Table 8 – Estimated Hot Water Requirements, Energy Intensity, and Greenhouse Gas Emissions of Pre-Rinse Spray Valves.

Water Use Category	% Hot Water*	Energy Intensity (kWh/MG)**	Avg GPM/ Valve***	Avg Daily Use/ Valves (in min.)	Total Water Use/ Day/Valve (in gal)	kWh/ Gal	kWh/Gal (adjustment for temperature difference)	kWh Used per Valve/Day	CH_4 lbs Emitted/ Valve/ Day	N_2O lbs Emitted/ Valve/ Day	CO_2 lbs Emitted/ Valve/ Day
Standard Pre-Rinse Spray Valves	100	21,000	2.92	39.6	115.63	0.021	1.370	2.50	0.000031	0.000032	2.349637
Efficient Pre-Rinse Spray Valves	100	21,000	1.28	54.6	69.888	0.021	0.8285	1.51	0.000019	0.000019	1.420121

*Assumes 100% hot water use. Source: (2005) Region of Waterloo Pre-Rinse Spray Valve Pilot Study Final Report. Veritec Consulting, Inc.

**From May 2009. Griffiths-Sattenspiel, B. and Wilson, W. The Carbon Footprint of Water. The River Network. http://www.rivernetwork.org/resource-library?tid=All.

*** Source: Tso, B. 2005. Pre-Rinse Spray Valve Programs: How are they really doing? SBW Consulting, Inc.

Note: Calculations for kWh per gal are based on kWh used by Tampa Bay Water to produce water in WY 2015. Calculations to determine CO_2 emissions from hot water use are based on data from the EPA's Air Market Program data website for calendar year 2015. CH_4 and N_2O emissions per hot water use type per day are based on data from the EPA's eGrid website for calendar year 2012.

Table 9 –Savings Based on Member Governments' Pre-Rinse Spray Valve Rebate Programs 2015.

Member	Total # of rebates (1996-2014)	Savi-ngs rate per day (in gal)	Total gallons saved/day (gpd)	kWh/ Gal*	Total kWh saved/ day	CH_4 lbs saved / day	N_2O lbs saved / day	CO_2 lbs saved/ day	CH_4 lbs /gal	N_2O lbs /gal	CO_2 lbs /gal	CH_4 lbs/ year saved	N_2O lbs/year saved	CO_2 lbs/year saved
St. Petersburg PRSV rebate program	342	400	136,800	0.02	2,106.72	0.05	0.06	4,046.12	3.95E-07	4.04E-07	0.02957687	19.70	20.16	1,476,832.26
Pinellas PRSV program	562	137	76,994	0.02	1,185.71	0.03	0.03	2,277.24	3.95E-07	4.04E-07	0.02957687	11.09	11.35	831,193.15
Hillsborough PRSV rebate program	14	103	1,442	0.02	22.21	0.0006	0.0006	42.65	3.95E-07	4.04E-07	0.02957687	0.21	0.21	15,567.19

* Energy intensity for pre-rinse spray valves is 21,000 kWh/MG. This information is found in May 2009. Griffiths-Sattenspiel, B. and Wilson, W. The Carbon Footprint of Water. The River Network. Www.rivernetwork.org. page 18. 21,000 kWh/MG is divided by 1,000,000 to find kWh/gal, then is multiplied by the water temperature differences between the average found in the REUS2 Study and the value for Toho, FL. The Residential End Uses Study Update found that, on average, water is heated by 62 degrees Fahrenheit for typical hot water use. The same study reveals that Toho, FL heats their hot water by an average of only 35 degrees F. We use 35/62 multiplied by the energy intensity for the adjustment in water temperature.

Note: This document is based on the assumption the identified power plants are the only source of power for Tampa Bay Water's water production. It must be noted that these are estimated calculations and in reality different sources of energy (ex: waste-to-energy, coal, nuclear, etc.) can be placed into the electrical grid and the makeup of power is modified. In reality the proportion of the power coming from these power plants to pump the water is unknown. For purposes of this document, that amount is estimated to be negligible.

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Appendix:

*Executive Order 07-127 called for the adoption of maximum greenhouse-gas emission levels for electric utilities that would "result in a reduction of greenhouse-gas emissions to 2000 levels by 2017, to 1990 levels by 2025, and to 80 percent of 1990 levels by 2050." Florida's utility CO2 emissions in 2000 were 135,080,858 tons, and for the year 1990 utility CO2 emissions were 100,109,860 tons. Executive Order 07-128 created the Governor's Action Team on Energy and Climate Change to "develop an Energy and Climate Change Action Plan that will achieve or surpass Executive Order targets for statewide greenhouse gas reductions specified in Executive Order 07-127." Along with the several Executive Orders issued, passage of HB 697 in the 2008 legislative session occurred. This bill created requirements for local land use plans to incorporate GHG reductions and sustainable planning. Some of the goals included in the bill were; discouragement of urban sprawl, energy efficient land use, GHG reduction strategies, increased water use efficiency, transportation strategies, and the use of renewable energy sources.

Governor Charlie Crist requested that by September 1, 2007, "the Florida Public Service Commission require utilities to produce at least 20% of their electricity from renewable sources, with emphasis on solar and wind energy." In addition, Florida was to adopt the California motor vehicle emission standards of a 22-percent reduction by 2012, and a 30-percent reduction by 2016, pending approval by the U.S. Environmental Protection Agency. Florida was also going to require a 15-percent increase of current standards in energy efficiency for new building construction and appliances sold in the state.

Executive Order 07-126 called for greenhouse gas emission reduction targets for state agencies and departments with a "10-percent reduction from current emission levels by 2012, a 25-percent reduction from current emission levels by 2017, and a 40-percent reduction from current emission levels by 2025."

To determine the current GHG emission levels, each governor's agency and department was directed to conduct an immediate GHG Reduction Scorecard of their GHG emissions during the July 1, 2006 through June 30, 2007 fiscal year. Emissions data were gathered from vehicle emissions, facility fuels, and electricity use.

BACK

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Appendix G

Water Conservation Plans

Hillsborough County
Florida

5-Year Water Conservation Plan (2016 – 2020)

Continued Implementation of the U. S. Energy Policy Act of 1994

Hillsborough County has adopted an advanced plumbing code, prior to the effective date of the U. S. Energy Policy Act of 1994 (EPACT), and continues to support efforts at facilitating further implementation, such as "WaterSense", similar to the Energy Star labeling program. The Hillsborough County Public Utilities/Water Resources Division became a promotional member of EPA's WaterSense Program during FY2014, and routinely distributes replacement showerheads and faucet aerators with water use efficiencies exceeding the requirements of EPACT. For example, whereas the EPACT limits the water use for showerheads, bathroom and kitchen faucet aerators to 2.5 gallons per minute (gpm), Hillsborough County currently purchases showerheads with a flow rate of 2.0 gpm, and aerators with maximum flow rates of 0.5 gpm for bathrooms and 2.2 gpm for kitchens. For Fiscal Years 2011 and 2012, the County awarded a bid to purchase 30,000 showerheads and bath aerators, and 15,000 kitchen aerators. This inventory is continued to provide will-call needs through 2015. Additional showerhead purchasing is budgeted in Fiscal Years 2016-2017.

Fixture Retrofit

In cooperation with the Alafia River, Hillsborough River and Northwest Hillsborough Basin Boards of the Southwest Florida Water Management District, Hillsborough County conducted a retrofit program through neighborhood canvassing during the 1994-1996 period. 47,000 retrofit kits were distributed door-to-door during this campaign with the District. The County continues to provide faucet aerators, showerheads and toilet tank leak detection tablets to interested parties during community events where the Public Utilities Department may have a display table set up, and for walk-in customers at its service centers. The Public Utilities Department has progressed from the distribution of in-tank volume displacement devices for toilets to providing incentives in the form of rebates for the voluntary replacement of higher volume toilets with new toilets using no more than 1.6 gallons per flush (see the next section). The Public Utilities Department plans to conduct a commercial kitchen pre-rinse sprayer replacement program during this plan's timeframe, and has purchased 1,000 fixtures to do so with. The first emphasis of this project is through the Department's FOG (Fats, Oils and Grease) monitoring program in commercial establishment venues, although this is a difficult venue as the FOG team is typically visiting an establishment regarding regulatory infractions. A second venue presented itself in FY 14, in the form of outreach through the Extension Office Nutritional Health Education program.

Motion Sensor Faucet and Toilet Flush Mechanism Research

In cooperation with the California Urban Water Conservation Council, as an agent for the American Water Works Association's Water Use Efficiency Division, the Public Utilities Department funded a study of pre- and post-installation of motion sensor operated faucets and toilet flush mechanisms in an office building in Tampa. This type of equipment, while highly acceptable due to its hygienic nature, is questionable as to its water conservation benefit. Manufacturers are touting the water savings of the equipment meanwhile, and pressuring water conservation professionals (and their respective senior management officials) to include retrofit of facilities with the equipment as a facet of their conservation programs. This one-of-a-kind research will provide much needed information about the efficiency of the equipment. The study concluded in 2008 and results were published in 2010. See the March 2010 report entitled "Sensor-Operated Plumbing Fixtures. Do they Save Water?" for a summary of the work. Report attached hereto.

Irrigation and Landscape Evaluation

Hillsborough County utilizes the services of the Cooperative Extension Service to augment its water conservation staff to conduct irrigation and landscape evaluations. Water consumption data is provided to the Extension Office for those properties undergoing these evaluations. This service is announced on the utility billing occasionally. The County participates in Tampa Bay Water's annual Water Wise Awards program.

Irrigation/Landscape Rebate

Hillsborough County Public Utilities Department funds low volume irrigation grants to neighborhood associations through the Office of Neighborhood Relations (ONR). This funding is to provide for the installation of, or conversion to low volume irrigation at neighborhood entries or within community association common areas. Use of this funding is currently restricted from private properties. Participation requires the use of a licensed irrigation contractor holding membership in the Florida Irrigation Society, and registered with the County as an approved vendor, carrying appropriate levels of insurance. Annual budget of $67,500 for this effort, accommodating twenty-seven (27) or more installations, at a maximum of $2,500.00 each. The ONR has been funding landscape mini-grants in addition to this.

Toilet Rebate/Replacement

Hillsborough County has had a successful ULV Toilet Rebate Program since 1994, providing incentives to accelerate the voluntary replacement of 83,774 older, higher volume fixtures at 58,481 locations through September 2015. Qualifications for participation are that; 1) property must be a water customer (as opposed to a wastewater-only customer) of the Hillsborough County Public Utilities Department, 2) the property must be older than 1995 (with few exceptions where a construction permit may have been pulled earlier), and 3) any and all rebates are subject to limitation by previous rebates issued to the same property. The participation rate had dropped off considerably in 2007, to the point where the program was discontinued with the termination of contract with an outside vendor, effective December 21, 2007.

Upon discontinuation of the program, public outcry suggested that rekindling the program would be in the best interest of furthering easily attainable water savings; thus, after obtaining Board of County Commissioners support in June, 2008, the Public Utilities Department renewed the program, running it internally, with a budget to issue 500 rebates annually. Having issued 4,473 separate rebates since then, the County has realized a savings of $203,521.50 in management fees. Staff intends to continue budgeting for this program as indications are there remain a significant number of properties yet to participate, including large multi-family locations. Furthermore, as the County takes over franchise utilities (having done so with Calm Harbor, Cypress Cove, East Lake, Fairview Village, Pebble Creek and San Remo in FY2015), many of those new customers will be eligible to participate in the program. During FY2014, the County registered this program with EPA WaterSense.

The following chart details rebates by year and user classification (SF = Single-Family; MF = Multi-Family; Comm = Commercial Properties) through September 2015. The rebate dollars of $9,435,418.31 do not include management fees paid to the independent contractor for their services (an additional $2,457,364.00), nor do the costs include any advertising, staff time, postage, promotional activities or disposal of old toilets.

Hillsborough County Toilet Rebate Activity by Year and User Classification									
	Toilets			Units (locations)			Rebate Dollars		
	SF	MF	Comm	SF	MF	Comm	SF	MF	Comm
1994	410	0	0	268	0	0	$41,000.00	$0.00	$0.00
1995	6,176	235	154	4,159	176	75	$707,105.55	$22,006.70	$14,936.31
1996	16,803	3,160	497	11,589	2,345	377	$2,021,598.89	$306,811.47	$45,929.38
1997	10,543	3,684	290	7,449	2,498	281	$1,295,808.08	$356,843.08	$28,604.18
1998	9,989	1,648	272	6,945	1,299	241	$1,156,321.11	$164,815.92	$26,688.54
1999	6,004	511	97	4,188	336	89	$675,986.95	$38,387.08	$9,680.06
2000	2,989	1,322	27	2,231	904	17	$350,629.43	$132,255.00	$2,700.00
2001	3,430	807	840	2,534	561	323	$408,130.17	$80,717.08	$83,888.15
2002	1,800	12	82	1,231	11	68	$191,047.62	$1,146.58	$8,168.89
2003	1,657	8	148	1,158	4	127	$179,552.64	$640.54	$14,782.77
2004	1,445	61	239	1,026	61	209	$154,631.50	$6,100.00	$23,893.63
2005	1,231	13	147	858	11	108	$128,519.52	$1,267.05	$14,692.56
2006	645	78	46	435	76	33	$66,895.92	$7,400.00	$4,600.00
2007	1070	53	254	736	43	207	$113,038.22	$5,300.00	$25,328.21
2008	294	37	212	208	6	11	$31,733.10	$3,825.00	$21,000.00
2009	619	3	0	453	1	0	$65,105.66	$270.00	$0.00
2010	682	1	2	472	1	2	$70,473.28	$125.00	$216.97
2011	617	19	19	429	1	5	$62,947.45	$1,900.00	$1,896.00
2012	333	0	0	203	0	0	$33,321.44	$0.00	$0.00
2013	377	2	47	259	2	3	$53,690.12	$213.32	$4,700.00
2014	479	515	0	331	357	0	$48,105.95	$51,500.00	$0.00
2015	629	7	3	439	5	6	$65,542.11	$554.13	$450.00
	68,222	12,176	3,376	47,601	8,698	2,182	$7,921,184.71	$1,182,077.95	$332,155.65
		Total Toilets	**83,774**	Total Rebates		**58,481**		Total Rebate Dollars	**$9,435,418.31**
								mgmt fees: 54,008 @ $45.50:	$2,457,364.00
								Total Program Hard Costs	$11,892,782.31

Soil Moisture Sensor Rebate

In preparation of the budget for FY16/FY17, the Public Utilities Department is including a measure to incentivize the installation of soil moisture sensors in irrigation systems. It has been since 1998 that a rebate program to install technology in an irrigation system to gain water saving has been offered by the County, prior to the research efforts of the University of Florida Institute of Food and Agricultural Sciences on rain sensors and soil moisture sensors. Initial planning of this measure is to offer rebates at up to $200.00 with a goal of issuing 120 rebates annually.

Clothes Washer Rebate/Replacement & Dishwasher Rebate/Replacement

Hillsborough County remains concerned about the portability of these appliances and the uncertainty that rebated appliances will remain installed at the location after the occupant relocates, eroding water savings if removed. There is no mandated water use efficiency for these white goods, as there is for toilets, faucets and showerheads; therefore it is not a requirement that the public meet these non-existent standards. Given the considerable price differential to purchase models of these appliances with greater water use efficiencies, it may be more cost effective to provide incentives to the manufacturers or retailers to leverage the cost to the consumer. This would best be done on a National level.

Cisterns/Rain Water Harvesting Rebate

In cooperation with the water management district, Hillsborough County has developed a Homeowners Guide to Rainbarrels brochure and companion VHS video, with an intention to re-release on DVD. This is provided to interested parties. The Extension Office routinely conducts rain barrel workshops where attendees gain knowledge of the basic principles of rain water harvesting and have the opportunity to purchase rain barrels at a discounted price. The County's Stormwater Management Division has also, in cooperation with the District, constructed an operational cistern at the County Courthouse in downtown Tampa. This is the extent to which the County currently promotes rain water harvesting.

Conversion to Automated Meter Reading

During 2008 the Public Utilities Department gained approval to implement a ten-year program to convert its entire customer base to AMR/AMI. As this program rolls out, the Public Utilities Department will be enabled to identify potential leaks and inefficiencies of use at its customer premises. This program remains on hold for 2016.

Industrial/Commercial/Institutional Audits and Repair

Hillsborough County funds Project C.H.A.M.P. aimed at promoting water use efficiency within the local lodging industry. The planned replacement of commercial kitchen pre-rinse spray valves will gain further water savings within the hospitality industry and additional water savings within the local school district. As a condition of SWFWMD Emergency Order SWF 01-14, the County hired the John Daily Florida Institute of Government (FIOG) to conduct water audits of the 30 largest ICI customers of the Water Department. Even though the Emergency Order was subsequently rescinded, FIOG completed the work and developed water conservation plans for the participating facilities. It is the intention of Hillsborough County to maximize implementation of recommended actions identified by FIOG as resources allow.

Florida-Friendly Landscape Principles

Hillsborough County's Land Development Code (LDC) addresses landscaping of improved lots within the County. During 2002, the LDC was amended to require irrigation systems to be designed and constructed to Florida Irrigation Society standards. Hillsborough County Public Utilities Department supplements Tampa Bay Water's funding of the Florida-Friendly Yards (FFY) Program at approximately $61,230 annually.

The FFY Program anticipates conducting 10-15 Rain Barrel Workshops annually, reaching from 500-750 clients and distributing 1,000 – 1,500 rain barrels. The FYN Program forecasts 10-15 Landscape Design Workshops each year, reaching 200-300 clients annually. The FYN Program plans on conducting 15-20 Water-Wise Workshops to promote micro-irrigation annually, reaching 375 – 500 clients and distributing 150 – 200 micro irrigation kits.

Water Conserving Rate Structures

Potable and Wastewater Charges

Hillsborough County continues the use of a four-tier water rate structure as implemented June 2003. The rate structure is as follows, effective June 1, 2015:

Water use	Charge/unit*	Base Charge	Waterwater Charge/Unit**	Wastewater Base
Tampa Bay Water	$2.93			
0 – 5,000	$0.69	$8.42	$4.38	$13.61
5,001 – 15,000	$1.92		$4.38 to 8,000 gallons	
15,001 – 30,000	$3.21			
30,001 >	$4.80			

* Does not Include Tampa Bay Water pass through charge

** Capped at 8,000 gals (8 units)/ equivalent residential connection

Additionally, there is a $4.05 bill charge per billing.

SF Reclaimed Water Committed Class

Monthly Charge: $9.00

SF Residential Metered Reclaimed Water Charges

Water use	Charge/unit	Base Charge
0 - 5,000	$0.26	$4.00
5,001 – 15,000	$0.42	
15,001 >	$0.57	

Multi-Family Residential Metering

Hillsborough County assumes liabilities when entering private properties, therefore, the Public Utilities Department will not provide incentives for multi-family properties to individually meter the housing units. Notwithstanding this, in discussions with property managers of such locations, the Departmental staff encourages sub-metering of those properties in the interest of conservation, when the reading of the sub-meters is conducted by a third party and the main property remains master-metered for billing purposes from the County. The Public Utilities Department participated in the National Multiple Family Submetering and Allocation Billing Program Study, available as a downloadable report at http://www.aquacraft.com/sites/default/files/pub/Mayer-%282004%29-National-Submetering-and-Allocation-Billing-Study.pdf .

Weather-Based Irrigation Controller Research

Following a presentation from Hydropoint Data Systems in August 2004, the Water Conservation Technical Advisory Committee recommended that Public Utilities Department undertake a local study of these irrigation controllers to evaluate their effectiveness in local weather conditions and soil structures. Negotiating with the University of Florida Institute of Food and Agricultural Sciences through the Florida Department of Consumer Affairs, a two phased project was designed, conducted and is now completed at the UF Gulf Coast Research and Education Center and within the existing customer base of

the utility in three separate neighborhoods. The first phase tested three different technologies against a time-based controller, and a time-based controller set at 60% ET deficiency, with four replications of each treatment in side-by-side landscape plots. The second phase looked at existing high to excessive customers, and matched pair landscapes to study the equipment in the real world. The work is complete and results suggest that while the technologies may be viable for larger landscapes with continual monitoring, it is not practical for the Public Utilities Department to develop a rebate program to encourage widespread installation of these technologies.

Educational

The Hillsborough County Public Utilities Department supports numerous educational initiatives aimed at imparting knowledge of Florida's water resources amongst various targeted audiences including the following:

- Cooperation with the Arts Council's In-School Water Theatre Arts Program
- Speakers Bureau
- Radio Advertisements
- Project Water CHAMP (Water Conservation in Hotels And Motels Program)
- Senior Citizen Water Education Training
- Printed Brochures
- Attendance w/Display at Town Hall Meetings
- Attendance w/Display at Community Events
- Annual Neighborhood Conference
- Annual Earth Day Events
- Website presence
- Annual Newspapers In Education Publication
- Promotion of Conservation Through Artwork
- 4-H Youth Water Camp
- Annual Great American Teach-In Event
- Bi-annual Condo & Homeowner Association Exposition
- Fix-A-Leak Week
- Hillsborough School District – Nature's Classroom
- FS/AWWA Drop Savers Poster Contest
- FS/AWWA Model Water Tower Competition

Water Restrictions Enforcement

Hillsborough County continues enforcement of mandatory water use restrictions for all properties within the unincorporated county area, regardless of that property's water source. Although we have not yet disaggregated this measure from all others, we feel strongly that this is an effective measure at managing demand. Such a disaggregation is expressly too costly, unless undertaken by a student working on thesis material. During Fiscal Year 2006, the Public Utilities Department gained BOCC approval to redirect processing of violations from the Clerk of the Circuit Court to Code Enforcement/Special Magistrate. The implementation of that change occurred in the first quarter of Fiscal Year 2007, which restores collected penalties and fees to the Water Conservation Reserve Fund. Collected penalties are deposited into a water conservation trust fund, available to further water conservation efforts as approved by the

Board of County Commissioners. Assuming this responsibility, the development of an accurate tracking system for enforcement activity and revenue collection was necessary.

During 2013 the enforcement activity was transferred from the Public Utilities Department to the Code Enforcement Department. At time of necessity, the entire Code Enforcement staff can be made available to concentrate on water restrictions enforcement.

CITY OF NEW PORT RICHEY

CONSERVATION PLAN OVERVIEW

The City of New Port Richey has an ongoing water conservation awareness that has led to reductions in gross water use and a lower per capita water demand. In calendar year 2013 the gross water use for the City was 2.55 million gallons per day and 83 gallons per capita per day. These numbers are consistent with historical figures that have averaged 3.0 millions of gallons gross water use and 100 gallons per capita per day since the City began its conservation efforts in earnest. Prior to that gross water use had been 3.5 millions of gallons per day of gross water use and had a gallons per capita per day use higher than 120.

- The City has entered into a cooperative funding agreement with SWFWMD on a Toilet Rebate Program that will replace 80 high volume toilets with low flow models.

- The City maintains one day per week irrigation restrictions, with enforcement by our Billing & Collection, Public Works and Police Departments and Code Enforcement.

- The City continues to supply customers with plumbing retrofit kits, outside conservation kits and toilet dye tabs for leak testing.

- The City includes a conservation awareness message on all water bills and in the City Newsletter and distributes conservation and leak detection information to all new city customers.

- Any City water account that reflects unusually high consumption is notified that they should look for leaks and provides them with leak and conservation information.
- The City's reclaimed water facility provided over 2.704 million gallons per day to the Pasco County Reuse System, and 2.286 million gallons per day to the City's Reuse System in 2013.

Pasco County Utilities

Water Conservation & Efficiency Program:

5 YEAR STRATEGIC PLAN and ACTIONS TO DATE

Update: December 2015

Above: *Crews Lake is one example of Pasco County's many aquatic systems benefitting from regional conservation and efficiency programs.*

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PASCO COUNTY FLORIDA
OPEN SPACES. VIBRANT PLACES.

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1) Introduction

1.1 Background

Pasco County is currently ranked among the top ten fastest growing counties in the state of Florida. In order to balance the projected population growth of Pasco County with sustainability of its natural ecosystems, the Pasco County Board of County Commissioners (BOCC) has taken a number of concerted and proactive steps in adopting comprehensive water conservation strategies. In addition to the highly successful Master Reuse Program, which offsets an average of more than three million gallons of potable water usage per day, Pasco County has pursued gains in water conservation and efficiency through a combination of landscaping and irrigation ordinances, High Efficiency Toilet (HET) rebates, tiered conservation-oriented rate incentives, targeted outreach and education, and cooperative partnership with the UF/IFAS Florida Friendly Landscaping ™ Program.

In 2014, Pasco County Utilities established the position of Water Conservation & Efficiency Coordinator (WCEC), dedicated to the coordination, planning, and implementation of conservation and efficiency initiatives, outreach, and education as part of Pasco County's ongoing commitment to the protection and preservation of regional water resources. Over the past year, the WCEC has worked to increase the efficiency and effectiveness of the Utilities' conservation programs, while pursuing new opportunities for residential, commercial, and governmental stakeholders. The WCEC position provides the Utility with a focused resource for the coordination of these efforts throughout the County and the region.

1.2 Goals, Benefits, and Approach for Conservation and Efficiency Programs

In previous decades, permitted over-pumping of groundwater resources in Pasco County to satisfy regional demand had proven detrimental to its natural aquatic systems. As a result, a robust regional effort has been actively working to reduce groundwater withdrawals in order to allow surficial systems to recover. Together with the Southwest Florida Water Management District (SWFWMD), the member governments of Tampa Bay Water (TBW), and UF/IFAS-Pasco County Extension Service's Florida Friendly Landscaping™ Program, Pasco County Utilities is committed to addressing water resource issues, focusing particular attention on the continued sustainability of groundwater withdrawals within the County.

Aside from directly benefitting the health of aquatic systems and ensuring the future availability of groundwater supplies, demand reduction can deliver a number of additional advantages, both direct and indirect, for the Utility and its customers. Reductions in demand can reduce operational costs for water and wastewater facilities, extend the lifespan of facilities and infrastructure, and delay the need for development of additional water or wastewater treatment capacity. For Pasco County, which anticipates significant population growth in the coming decades, these are particularly relevant issues, as water conservation and efficiency programs should be considered as cost-effective substitutes for increasingly expensive development of water supplies and wastewater treatment capacity. Well-designed conservation and efficiency programs therefore potentially confer measurable cost savings to customers, both directly (i.e. less end-water use = lower bills), and indirectly (i.e. deferred capital costs = delayed rate increases).

Additionally, the Tampa Bay region historically has experienced periodic cycles of drought and associated water supply shortage. Rather than face the challenges of imposing hurried, stringent restrictions when confronted with water shortages (e.g. the ongoing California drought crisis), it is far simpler and more preferable to encourage Utility customers to adopt everyday conservation and efficiency measures which are less likely to impact standard of living *before* shortage conditions exist. Such proactive measures can help extend supply through periods of drought. Furthermore, when Utility customers are already conservation-minded, there is potentially less need for extensive education and enforcement when faced with shortage conditions.

Pasco County Utilities has worked to actively engage not only the customer base of PCU, but all of the citizens of the County, with specialized outreach programs currently underway or in development for Pasco County schools, homebuilders and developers, residential high-usage customers, businesses, and the general public. Under the guidance of this Strategic Plan, Pasco County will continue its goal to educate and engage the community about the complexities of the region's water supply issues and the importance of conservation.

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2) Pasco County Utilities' Water Conservation & Efficiency Programs:

The following pages contain an in-depth look at Pasco County Utilities' core Water Conservation & Efficiency programs. For more information on any of these programs, please contact the Water Conservation & Efficiency Coordinator at fgaldo@pascocountyfl.net, or by telephone at (727) 847-8131 x6813.

2.1 Master Reuse System

The utilization of reclaimed water to offset potable demand has been among the most effective potable water conservation strategies in Florida. Pasco County's Master Reuse System (PCMRS), produces reclaimed water that meets the requirements of the Florida Administrative Code, Chapter 62-610, at five facilities, which is delivered through an extensive infrastructure including 12 pump stations and storage tanks, and more than 600 miles of transmission and distribution lines. Reclaimed water is provided to numerous subdivisions and golf courses through master meters equipped with hydraulically operated, remotely controlled valves. The PCMRS services more than 12,000 residential customers and more than 250 commercial customers. In addition, as of 2015, there were 14 golf courses, 10 schools, and more than 700 acres of agricultural lands served by the reclaimed system.

Since the development of the PCMRS, Pasco County's Board of County Commissioners has been committed to a total reuse strategy. To accommodate that strategy, PCU has endeavored to expand availability, management options, and storage capacity. The County has mandated through its reclaimed water ordinance (Article III Section 110-74) that each new development within the reclaimed water service area shall include a reclaimed water distribution system. PCU has implemented a tiered pricing structure, predicated on availability that encourages bulk users to utilize reclaimed water in lieu of using other, more finite water resources.

Pasco County operates and maintains the 100-million-gallon Land O' Lakes Reclaimed Reservoir, the largest of its kind in the state. Presently in final phases of construction, the Boyette Road Reclaimed Reservoir will hold approximately 500 mg, significantly increasing Pasco County's storage capacity, and allowing the system to continue to meet the growing demands of the County in the coming years.

The reclaimed water produced by the PCMRS has been primarily used to satisfy irrigation demand. Other management options have included the use of Rapid Rate Infiltration Basins (RRIBs) for groundwater recharge, restoration/recovery of deteriorated aquatic systems, and delivery for industrial processes. Factoring in production, storage, distribution, efficiency, and infrastructure, the PCMRS is considered one of the most dynamic reclaimed water systems in the country.

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Right: *Currently in final phases of construction, a rendition of the Boyette Road Reservoir which will provide storage for approximately 500 million gallons of reclaimed water.*

PASCO COUNTY MASTER REUSE SYSTEM (PCMRS) BOYETTE ROAD RESERVOIR

For more information on the Pasco County Master Reuse Program please contact Pamela (Wright) Lynch: plynch@pascocountyfl.net or visit: http://www.pascocountyfl.net/index.aspx?NID=579.

2.2 High-Efficiency Toilet Rebate Program

The Ultra-Low Volume (ULV) and High-Efficiency Toilet (HET) Rebate Program has been Pasco County Utilities' primary customer-oriented active conservation strategy. This multi-phase effort, cooperatively funded by the SWFWMD, was initially designed to encourage residential water customers to replace their high water-use (≥3.5 gallons per flush [gpf]) toilets with ULV (1.6 gpf)* and HET (≤1.28 gpf) models through rebate incentives. [****Note*: *In the most recent phases of the program, rebates were made available only for HET in order to maximize the cost-effectiveness of the program.*]** Qualifying PCU customers were eligible for up to a $100 rebate for one toilet and up to $80 for a second retrofitted toilet. Rebates were credited directly to the customer's account. Included as part of the program was a plumbing retrofit kit that included a high efficiency toilet flapper repair kit, a high efficiency

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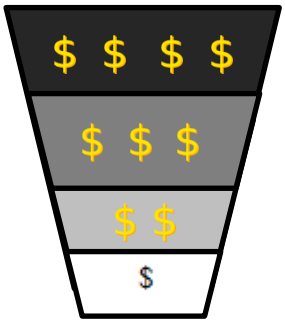
shower head, a kitchen and bathroom faucet aerator, leak detection tablets, a faucet/shower head measuring device, and a water wheel conservation information tool.

Phase I of the program began in 2008, offering the rebate to 500 PCU customers. This Phase of the program realized a savings of more than 10,000 gallons of water daily or 3.7 mg of water annually. Currently the program is in its Eighth Phase, with more than 5,800 rebates issued since the inception of the program. It is expected that Phases II through VIII will save approximately 7 million gallons of water annually. More than 11 mg of water are expected to be saved annually once the program has been completely implemented. The program has been such a success that PCU plans to continue the Toilet Rebate Program. With approximately 38,000 potential qualifying PCU customers, there remains an opportunity for substantial water savings.

For more information on this program, please contact the Pasco County Utilities Ultra Low Flow Toilet (ULFT) Rebate program administrator at 1 (800) 964-2140, or send email to plynch@pascocountyfl.net.

2.3 Conservation-oriented tiered rate incentives



In 1996, Pasco County Utilities adopted an inverted, conservation-oriented tiered water rate structure. This type of inverted block rate structure can help to encourage conservation and efficiency through financial disincentive, wherein water usage becomes increasingly expensive as it exceeds non-discretionary needs.

These rates are periodically scrutinized and equitably adjusted, and are based upon the real costs of treating and delivering water to customers. Factors also include the costs the County has incurred for system improvements, maintenance, operations, administration and financing. Each set of proposed recommended changes must pass through a public hearing process before new rates can be adopted by resolution and put into effect. The residential rates for potable water (effective as of October 1, 2014), are shown in Table 1.

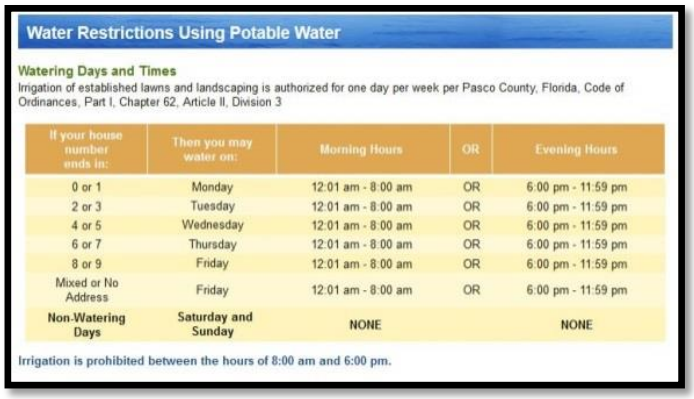
PER UNIT WATER CHARGES 5/8" & ¾" ONLY	Base Rate = $7.83
1,000 to 6,000 gallons	$2.70 per 1,000 gallons
6,001 to 9,000 gallons	$3.63 per 1,000 gallons
9,001 to 15,000 gallons	$4.59 per 1,000 gallons
>15,001 and over	$5.53 per 1,000 gallons

Table 1. Residential rates for potable water (effective as of October 1, 2014).

An important note regarding inverted block rate structures: In situations where high consumption was the result of a significant leak, a utility may deem it appropriate to modify or waive the higher-tiered rate charges that resulted from such unintentional usage, so as not to effectively "penalize" a customer for unintentional high usage. Pasco County Utilities' Billing Adjustment Policy was designed to allow for such adjustments to be made in instances where upper tier charges were incurred due to a leak. Under this policy, bills for excess water usage are not forgiven, but are instead reduced to wholesale rates. (*See Pasco County Ordinance; Section 110:40 Billing Adjustments, Pasco County Utilities.*)

Tiered rate structures can potentially inequitably impact low-income customers, since financial constraints may limit these customers' ability to upgrade fixtures and appliances or to promptly repair leaks. Coupling inverted block rates with rebate programs for water-efficient fixtures and appliances, as PCU has done through its HET Rebate Program, helps to address such unintended hardships on low-income customers. Likewise, the aforementioned leak-adjustment policy effectively provides financial incentive for the repair of leaks, reducing a customer's "decision dilemma" of paying their water bill versus fixing a leak.

2.4 Pasco County Landscaping and Irrigation Ordinances



Water Restrictions Using Potable Water

Watering Days and Times

Irrigation of established lawns and landscaping is authorized for one day per week per Pasco County, Florida, Code of Ordinances, Part I, Chapter 62, Article II, Division 3

If your house number ends in:	Then you may water on:	Morning Hours	OR	Evening Hours
0 or 1	Monday	12:01 am - 8:00 am	OR	6:00 pm - 11:59 pm
2 or 3	Tuesday	12:01 am - 8:00 am	OR	6:00 pm - 11:59 pm
4 or 5	Wednesday	12:01 am - 8:00 am	OR	6:00 pm - 11:59 pm
6 or 7	Thursday	12:01 am - 8:00 am	OR	6:00 pm - 11:59 pm
8 or 9	Friday	12:01 am - 8:00 am	OR	6:00 pm - 11:59 pm
Mixed or No Address	Friday	12:01 am - 8:00 am	OR	6:00 pm - 11:59 pm
Non-Watering Days	**Saturday and Sunday**	NONE		NONE

Irrigation is prohibited between the hours of 8:00 am and 6:00 pm.

In Florida, sub-tropical climate conditions, sand/clay soils, and the prevalence of automatic irrigation systems combine to create substantial water-saving potential through pursuit of increased irrigation efficiency. To this end, the Pasco County BOCC enacted a landscape ordinance in 2002 that mandates efficient irrigation system design and installation, limits the amount of turf grass that requires irrigation, mandates a minimum of 30 percent native vegetation, and limits high volume irrigation to no more than 50 percent of a property's green space. The County currently restricts irrigation of established landscapes to one day per week (potable or well water) and two days per week (reclaimed). (See Chapter 62 - NATURAL RESOURCES, ARTICLE II. - WATER SUPPLY, Sec. 62-98. – Declaration of water shortage; restrictions; & Pasco County Land Development Code, Chapter 900, Sec. 905.2 & 905.4)

***A brief note on Soil Moisture Sensors (SMS)**:*

The County's landscape ordinance requires all new irrigation systems to be equipped with a rain shut-off device *or* Soil Moisture Sensor (SMS) [per Chapter 373.62, Florida Statutes / SWFWMD Rule 40D-22, Year-Round Water Conservation Measures]. As of 2005, the ordinance included a provision that allows for 65 percent of a property's green space to be irrigated turf grass with the use of SMS devices, as an incentive to encourage their installation in new development throughout Pasco County. This modification was based on recent research from UF/IFAS showing that SMS technology offers substantial water conservation benefits over rain shut-off devices*, particularly over the long-term. Recent increases in SMS building permits may indicate an upward trend in builders' adoption of SMS technology.

*Savings contingent upon proper siting and calibration.

Please visit http://www.pascocountyfl.net/index.aspx?NID=172 for information on watering restrictions and schedules.

2.5 Builder / developer outreach plan to improve water efficiency during sod establishment and customer move-in period

Program Summary:

Issue addressed: *Home-builders' irrigation during sod-establishment period is often extremely excessive, especially when compared to recent UF/IFAS research on the water requirements of turf-grass establishment. In addition, in situations where the sod establishment period had not been completed before the new homeowner assumed responsibility for the water account, some homeowners have been blindsided with extremely large first water bills, due to the continuation of the builder's excessive irrigation schedule. This has created customer service issues for both Utilities and the builders, and an unpleasant "welcome" for the new homeowner/customer.*

Solution: *Working directly with builders / developers / irrigation professionals / FFL™ Program Coordinators to determine current practices, knowledge gaps, information needs, and develop an action plan.*

- Development of a variety of educational materials for builders / developers regarding:
  - BMPs for sod establishment irrigation, according to UF/IFAS research.
  - Irrigation scheduling for the post-establishment period – best practices, Pasco County Landscape and Irrigation Ordinances, etc.
  - Common programming mistakes for irrigation timers – educational materials.
  - Raising awareness of assistance available through UF/IFAS Pasco County Extension Service / Florida Friendly Landscaping™ Program.
  - Benefits of Soil Moisture Sensors (contingent upon proper calibration and location) re: potential water savings during wet and dry conditions.
    - Incentives available via the Pasco County Landscape & Irrigation Ordinance - allows higher percentage of yard to contain irrigated turf with installation of SMS due to expected substantial water savings (65/35 vs. 50/50).
    - Increased reliability compared to rain shut-off devices.
    - Promotion of "smart irrigation," "green homes," water & cost-saving, etc.

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Detailed Program Description:

The sod establishment period often represents one of the most intensive uses of water in a residential setting. Even when established according to best practices, the typical Floratam / St. Augustine lawn requires over six (6) gallons of water per square foot. An examination of builder water usage indicated that while irrigation rates vary widely among builders and developments, most builders vastly exceeded the horticultural requirements for turfgrass establishment.

Discussions with builders indicated that this level of water usage was often considered "the cost of doing business." However, aside from the direct cost incurred by homebuilders, this thinking had repeatedly presented problematic dispute situations with new homeowners, who often were blindsided by a shockingly high initial water bill – the result of the irrigation timer programming left behind by the builder. As these customers attempted to assign blame for their unexpected water usage, this typically became an issue for both Utilities Customer Information & Services and for the builders.

In order to address this issue, the WCEC began a pilot program in conjunction with the Florida Friendly Landscaping™ Program Coordinator to work proactively with members of the builder / developer community. This proactive approach has included the development of builder / developer outreach plan designed to improve water efficiency during the sod establishment period, facilitate adoption of SMS technology, and ensure transition to an efficient maintenance irrigation schedule for the benefit of the incoming customer.

Input has been sought from members of the builder / developer community, as well as from irrigation professionals in order to determine current practices, critical knowledge gaps, and information needs, in order to develop a strategic plan for successful implementation. Educational materials have been compiled pertaining to the benefits of SMS, irrigation best practices for sod establishment and maintenance (according to UF/IFAS research), and common irrigation timer programming errors. Thus far, response to this pilot program has been positive, and preliminary results are currently being tracked to determine the potential water savings through widespread implementation.

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2.6 Pasco County Utilities Customer Information & Services / UF/IFAS Pasco County Extension Service - Florida Friendly Landscaping™ Cooperative Irrigation Assistance Program

Program Summary:

Issue addressed: *Turf-grass and landscape irrigation typically represents the single largest use of water for Florida homeowners. Irrigation systems can use in excess of 1,000 gallons for each hour they run – or approximately 20 gallons per minute. Simple errors in programming an irrigation timer can easily result in vastly excessive irrigation, which often goes unnoticed unless a homeowner receives an unexpectedly high water bill. These programming errors, while easy to make, are often difficult for homeowners to self-diagnose and correct.*

Solution:

- Utilize complementary proactive / reactive strategies
- Identify customers whose usage of potable water for landscape irrigation significantly exceeds horticultural requirements -and/or- whose irrigation usage is excessive due to an unintentional timer programming error.
    - Customers are identified one of two ways:
        1) Proactive – By comparing billed usage (over 25,000 gallons) to a theoretical "Target Maximum" usage (based upon lot size and pervious area), high-consumption accounts are identified as candidates for irrigation outreach.
        2) Reactive – In response to customer complaint/concern. Provides a high level of successful dispute resolution.
            - Meter profiles are typically used to identify/confirm usage patterns consistent with excessive irrigation. Customer often initially denies irrigation is occurring on the schedule identified in profile, or is unable to self-diagnose the programming issue(s). Customers in this category often believe the system is OFF, running once per week, etc. Attempts at self-troubleshooting have failed.
    - FFL™ Program Coordinator provides education and assistance regarding efficient irrigation, proper timer programming, etc.
    - FFL™ Program Coordinator confirms current settings on irrigation clock (in presence of homeowner); makes changes as necessary for efficient irrigation, and for compliance with Pasco County watering ordinance (All changes made with explicit permission of homeowner.)

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Program benefits:

- *Substantial potable water savings, cost savings, demand reduction*
- *Prevention of recurrence through customer education*
- *Complaint/dispute resolution if customer was unable to self-diagnose issue*
- *Promotion of Florida Friendly Landscaping™ principles*
- *Increased awareness of FFL™ Program & UF/IFAS Cooperative Extension*

Detailed program description:

With the combination of high-volume usage, high-tech controllers (allowing multiple start-times, multiple programs, etc.) and automatic operation during overnight or early morning hours, irrigation systems can waste vast quantities of water - inadvertently and unknowingly - through a variety of simple programming errors. In fact, incorrect programming of automatic irrigation timers is frequently identified through Utility troubleshooting as a cause for customers' unexpected high water usage. However, due to the complexity of irrigation timer programming, this is often one of the most difficult issues for a customer to self-diagnose and troubleshoot. In fact, even when presented with water meter flow data clearly illustrating excessive irrigation as the cause (in the form of a meter profile), customers are often "certain" that their "irrigation system is off," or that "they ONLY water once per week."

In an effort to both provide the highest levels of customer service and promote responsible use of Pasco County's water resources, Pasco County Utilities has established a proactive partnership with the Pasco County Cooperative Extension Service's FFL™ Program Coordinator. Pre-qualified customers are eligible to receive a free irrigation efficiency consultation through the Pasco County Cooperative Extension Service's FFL™ Program.

Participating customers receive a free assessment of their landscape's water requirements, as well as on-site assistance and education in efficient irrigation timer programming. Consultations may also include test-running of the irrigation system in order to check for leaks, broken sprinkler-heads, misdirected sprays, and other potential sources of irrigation inefficiency. Homeowners also receive publications from UF/IFAS including the *Florida Yards and Neighborhoods Handbook* and *Plant Selection Guide*, a rain gauge to assess need for irrigation, and a catch-can to measure irrigation output.

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After a customer has received assistance, water usage is tracked and compared with prior usage history. Customers who have participated in this outreach program typically have realized immediate, significant, and lasting reductions in their monthly water usage. As a direct result of this collaborative partnership with the FFL™ Program, it is estimated that Pasco County Utilities' customers collectively saved 25 million gallons of potable water during the past year, simply through increasing the efficiency of their landscape irrigation.

In addition to producing significant levels of measurable water savings, this cooperative program has frequently yielded benefits for Utilities Customer Service in the form of dispute resolution, as the Program Coordinator is often able to confirm, in the presence of the customer, instances where irrigation timer settings effectively accounted for their disputed high usage. Because customers were often unaware of irrigation programming mistakes (and their potential for substantial water waste), the expert's education and on-site confirmation of irrigation settings are often critical in providing an explanation and context for the high usage. By providing both an adequate explanation ***and*** the appropriate solutions to prevent recurrence, a formerly negative customer experience (i.e. an unexpected high bill) has often been transformed into a genuinely positive customer service experience - one which demonstrates the best in local government cooperation working for the benefit of its citizens.

Selection and pre-qualification process

Customers may be selected for this program by one of two methods:

Proactive: Periodically, reports of high-consumption (≥25,000 gallons), active residential accounts are exported from the CIS to be screened by the Program Coordinator, who will determine whether a customer qualifies for assistance. Determinations are based on lot size, pervious area, and a theoretical "Target Maximum" water usage. Customers selected by this method are contacted directly by the Program Coordinator and offered assistance through the program.

Reactive: Alternatively, customers are referred to the Program Coordinator after contacting Utilities regarding a high usage complaint. The Program Coordinator's services are offered if the usage has been determined by Utilities to be likely related to irrigation inefficiencies, often through AMR profile analysis. If the customer accepts assistance, they are placed in contact with

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the Program Coordinator to schedule a site visit. Results from the site visit are then relayed back to the referring Utilities staff for documentation in the customer's account.

From a customer service standpoint, this cooperative partnership has yielded excellent results for dispute resolution when excessive irrigation was implicated as contributing to the high usage. Simultaneously, from the perspective of conservation and efficiency, the program has yielded significant quantifiable water savings. This unique program will continue to be a key component in Utilities Customer Information & Services outreach and education, and could potentially serve as a model for similar cooperative programs throughout the region.

2.7 Customer Education & Outreach Regarding High Consumption

Program Summary:

Issues addressed: *Upon reviewing numerous cases of high-consumption disputes, several common reoccurring themes emerged which tended to contribute toward escalation. Issues included lack of understanding of flow rates, confusion over bill presentation, and a lack of basic DIY troubleshooting skills. Customers often (falsely) believe that in order to attain their recent increase in consumption, "their house should be underwater, etc…" however, with high consumption, this is very rarely the case. Relatively few high-usage scenarios actually result in catastrophic flooding of the home or yard. Most causes of high usage can easily go unnoticed – until a large bill is received.*

Increasing the effectiveness of customer communication and education was identified as a potential means to help achieve greater satisfactory resolution, reduce escalation of disputes, and possibly prevent future recurrence of high-usage events.

Solution:

Enhancement of Pasco County Utilities Customer Information & Services' communication and customer education regarding high consumption:

- Addresses the question, "How could I have used that much water?"
  - End goals of successful communication:
    - Customers educated about numerous possible causes for high usage, gain a better understanding of common flow-rates, etc.
    - Customers learn simple DIY self-checks.
    - Customers learn to identify and address common sources of inefficiencies / high-usage.
    - Customers learn how to prevent / self-diagnose future issues.
    - Provides opportunity to teach additional efficiency tips such as seasonal irrigation adjustment, etc.

Detailed Program Description:

Pasco County Utilities Customer Information & Services Department has routinely delivered a variety of information and assistance to customers concerned about high usage. Troubleshooting tips and Do-It-Yourself checklists have been provided over the phone, via email, online at the Utilities website, and via informational pamphlets available in the lobbies of Utilities offices. Information typically has included how to check meter readings, how to use the meter "flow indicator" to check for leaks, how to dye-test toilets, how to check water softeners, how to perform overnight reads, and how to comply with County Ordinance regarding water-use restrictions. Water-saving tips are also regularly provided to Pasco County Utility Customers and the greater Pasco community through billing inserts, the "Community Connection Newsletter," and through contributions to Chamber of Commerce newsletters.

However, upon reviewing numerous cases of high-consumption disputes, several common recurring themes emerged which tended to contribute toward complaint escalation. Issues included lack of understanding of flow rates, confusion over bill presentation, and a lack of basic DIY troubleshooting skills. Increasing the effectiveness of customer communication and education was identified as a potential means to help achieve greater satisfactory resolution, reduce escalation of disputes, and possibly prevent future recurrence of high-usage events.

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To this end, a suite of communication tools have been drafted by the WCEC (pending approval) with the goal of increasing customer confidence in conveyed information, and reducing the number of escalated calls. These include draft customer communications regarding:

- DIY troubleshooting for high usage
- leak detection
- FFL™ Irrigation Assistance Program
- AMR / billing
- Interpretation of profile patterns

A note on troubleshooting high consumption as it relates to conservation and efficiency:

When blindsided by an unexpected high water bill, a customer's first assumption may be to suspect the meter, meter reading, or billing processes. However, the overwhelming majority of high usage concerns are related to actual (but yet unidentified) usage of water. Often, the water in question did not go toward useful or necessary purposes, but was instead "wasted," or used inefficiently. Such wasted water is possibly the easiest target for conservation, since the customer had no intention of using it in the first place, and now has an active interest in preventing recurrence. However, the Utility must first help the customer understand *how* the water may have been unknowingly used or "lost" in the first place.

When a customer contacts Utilities with a question, concern, or complaint related to high water usage, they ultimately require two pieces of information: 1) how this usage could have occurred without their knowledge, and 2) how to prevent its recurrence. If communication is successful, the customer not only addresses their current issue; they also acquire an awareness of a) the numerous unseen ways that water can be used without any knowledge of the homeowner, b) the necessary means to check for additional problems in the future, and c) relief that they will not continue to face similar bills month after month.

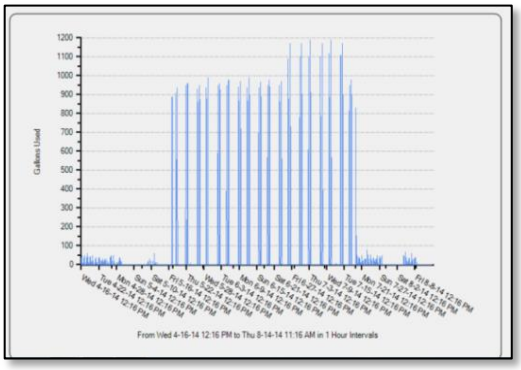
2.8 AMR System & CIS Software

Above: *A Meter Reader downloads profile data.*

Pasco County's water service is measured and billed using meters. PCU has recently completed implementation of Automated Meter Reading (AMR) technology throughout the potable and reclaimed water systems. The AMR system enables field representatives to efficiently and accurately obtain water usage data, flag accounts with possible leaks, and identify meter tampering via a radio-transmitted signal without encroaching on a customer's property. Together with a new CIS billing system, implemented in July 2014, this technology is enabling PCU to develop targeted, proactive and reactive communication with customers regarding high consumption concerns.

The meters internally log flow history, recorded in 10 gallon increments. In the event that a customer has experienced a period of unexpected high usage, this flow record can be downloaded from the meter using a hand-held receiver. Known as a "*profile*," this data allows Utilities staff to provide unprecedented levels of targeted customer service in response to unexpected high usage. When communicated effectively, the profile has proven a highly effective tool for dispute resolution and customer assistance.

Below & right: *Excerpts from a profile show a pattern consistent with excessive high-volume irrigation – the result of a common timer programming error.*



Sun 5-18-14 06:16 PM	0
Sun 5-18-14 07:16 PM	0
Sun 5-18-14 08:16 PM	870
Sun 5-18-14 09:16 PM	900
Sun 5-18-14 10:16 PM	780
Sun 5-18-14 11:16 PM	910
Mon 5-19-14 12:16 AM	560
Mon 5-19-14 01:16 AM	30
Mon 5-19-14 02:16 AM	0
Mon 5-19-14 03:16 AM	0
Mon 5-19-14 04:16 AM	0
Mon 5-19-14 05:16 AM	0
Mon 5-19-14 06:16 AM	600
Mon 5-19-14 07:16 AM	940
Mon 5-19-14 08:16 AM	820
Mon 5-19-14 09:16 AM	870
Mon 5-19-14 10:16 AM	610
Mon 5-19-14 11:16 AM	240
Mon 5-19-14 12:16 PM	0
Mon 5-19-14 01:16 PM	0

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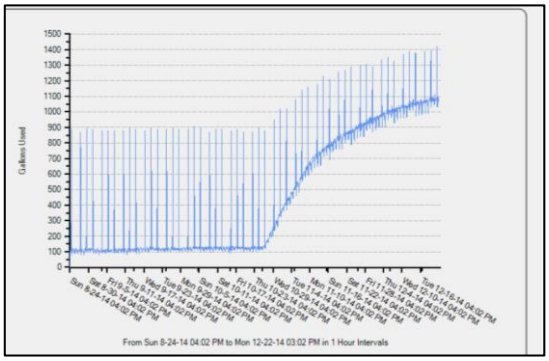

Above: *(L) A small defect in a PVC pipe, discovered as the source of a 1,000,000+ gallon underground leak through the cooperative efforts of Pasco County Utilities Customer Information & Services and the Pasco County FFL™ Coordinator. (R) A graph showing the escalating water consumption resulting from the pipe failure. At the time of discovery, average flow exceeded 1,000 gallons per hour, punctuated by even higher usage during irrigation events. This type of data is now available through the Pasco County Automated Meter Reading (AMR) system.*

2.9 Industrial / Commercial / Institutional (ICI) Outreach Program

While the majority of conservation and efficiency outreach efforts have been focused on the residential sector, the WCEC has begun several preliminary initiatives targeted toward the ICI sector in Pasco County. These have included:

- Creation of billing system reports for identification of high-consumption commercial accounts, followed by proactive courtesy outreach. (See example illustrated below.)

- Communication with Pasco County School District Conservation & Recycling Program staff regarding opportunities for water conservation & efficiency at District facilities.
    - Focused on cost-effectiveness of various strategies, such as:
        - A/C Cooling Towers
        - Pre-rinse spray valves (kitchen/cafeteria)
        - Toilet / urinal efficiency
        - Landscape / athletic field irrigation

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- Promotion of water conservation & efficiency programs targeted at lodging facilities:
  - *Southwest Florida Water Management District's Water Conservation Hotel and Motel Program (Water CHAMP)*
  - *US Environmental Protection Agency's H_2OTEL Challenge*

Water CHAMP

Southwest Florida Water Management District (SWFWMD) sponsors The Water CHAMP, which assists regional lodging facilities in implementing meaningful, cost effective water saving measures such as linen and towel reuse programs. Participation is straightforward and free of cost for regional lodging facilities. Printed materials, a self-audit checklist, and a training video for staff are all included to assist with implementation of the program. Pasco County Utilities has actively promoted the program to County lodging establishments through the Department of Tourism and local Chambers of Commerce.

H_2OTEL Challenge

In February 2014, the US Environmental Protection Agency (EPA) launched the Water Sense H_2OTEL Challenge in February 2014, to encourage hotels to "ACT." ACT is an acronym, standing for:

- **Assess** water use and savings opportunities
- **Change** products or processes to incorporate best management practices
- **Track** their water–saving progress and achievements

Lodging facilities may visit the H2Otel Challenge website to start receiving free recognition, outreach, and technical tools that will assist in saving water, energy, and

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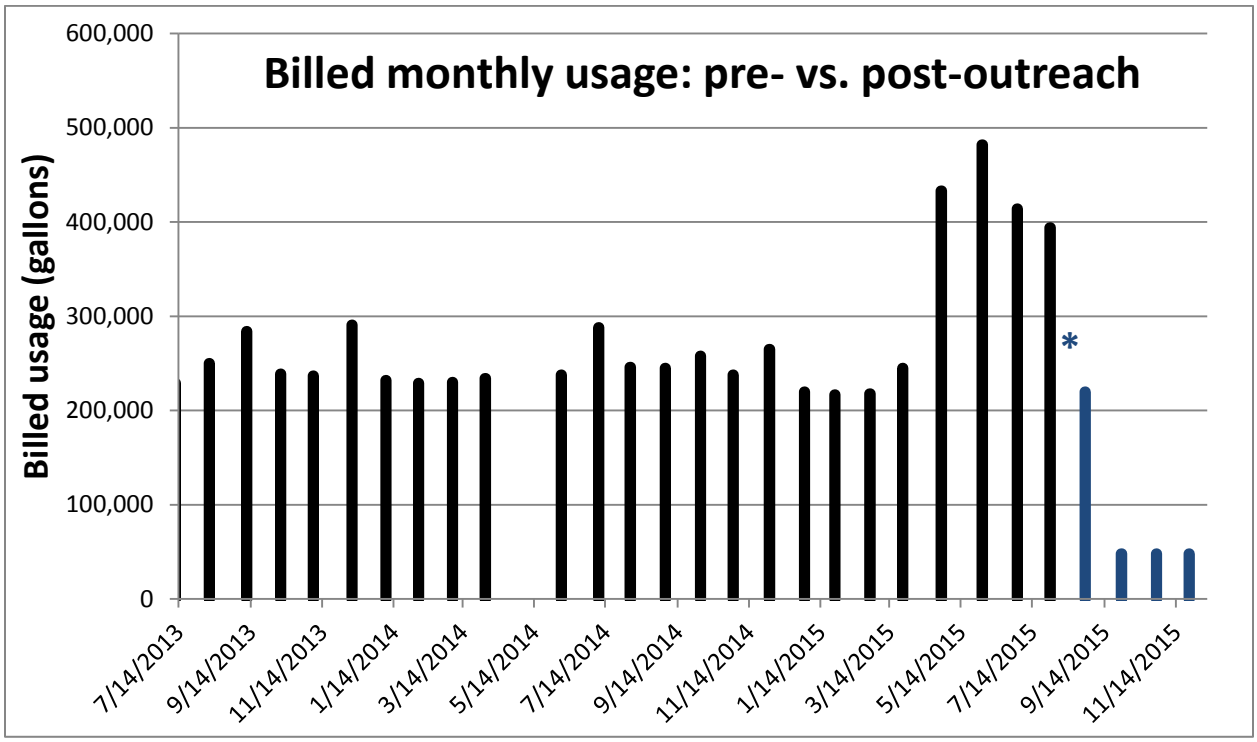
money. Webinars are periodically offered to introduce interested businesses to the program benefits and requirements.

As part of April's Water Conservation Month activities, the WCEC actively promoted the availability of these programs, including an introductory webinar for the H_2OTEL Challenge (*"Take the Plunge"* - April 16th, 2015) to Pasco County lodging facilities through a variety of routes, including the Pasco County Department of Tourism and regional Chambers of Commerce.

Example - An ICI Outreach Case-Study:



Above: *Unusually high usage for this commercial account was identified through analysis of billing system data. Following proactive courtesy contact in August 2015, the dramatic reduction in usage significantly exceeded anticipated levels, decreasing by a factor of approximately 10x compared to the previous maximum monthly consumption (48,000 gallons versus 482,000 gallons).*

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2.10 Annual Water Awareness Poster Contest

Background

The Annual Water Awareness Poster Contest is a joint outreach program between Pasco County Utilities and the Florida Governmental Utility Authority (FGUA) that educates Pasco County elementary school students (K-5) about water's importance. Beginning in 2010 as a decision between Pasco County Utilities and FGUA administrations to collaborate on marketing initiatives for their respective school outreach programs, the program has developed into a full-fledged partnership between the two utilities, with cooperation and logistical support from the Pasco County School District's Office of Teaching and Learning.

From early participation levels of ten schools and approximately five hundred students, the program has experienced steady growth, thanks in part to the support of the District's Office of Teaching and Learning, increased community sponsor contributions, and process improvements designed to streamline registration, distribution of materials, and poster submission procedures. In 2013, this program received acclaim from the Florida Chapter of the American Water Works Association (AWWA), recognized as "Best in Class" for Public Education Programs.

<u>2015 Contest – Water, Water Everywhere:</u>

The 2015 Water Awareness Poster Contest witnessed significant growth, with representation from thirty public schools, and nearly one hundred teachers registered throughout the District. This growth was due to a number of factors, including streamlined program design, and increased staff resources with the addition of the WCEC.

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Based on teacher feedback from previous years, an expanded suite of teaching materials and classroom activities was developed for the 2015 program, including the creation of seven 'mini-themes' within the general program theme, "Water, water, everywhere!" This allowed teachers increased flexibility and customization of the program to suit their individual curricula and grade level. Mini-themes examined subjects such as: Where is fresh water found? How do plants and animals survive when water is scarce, and what can humans learn from these adaptations? Aside from simple survival, how do people use water? What can we do to use water wisely?

The 2015 program benefitted significantly from the introduction of a fully developed website – www.watercontest.org, which provided online access to PowerPoint presentations, teaching materials, classroom activities, rules and instructions, and sponsor information. The website was central to a number of process improvements designed to streamline the registration and submission phases of the contest. Because program materials were available electronically, the 2015 program saw a significant reduction in the amount of paper materials requiring distribution throughout the county. This provided savings of costs and resources, reduced greenhouse gas emissions, and significantly reduced lag times for distribution of materials to and from teachers.

Teacher feedback for the 2015 Contest was solicited via an online survey administered after program closeout. Feedback for this year's contest was overwhelmingly positive, indicating a very high level of satisfaction among participants. Future programs will continue to focus on creating teaching materials that are highly interactive, engaging, and adaptable, working closely with the District and its teachers to ensure strong fit within curriculum and Common Core.

The WCEC and the Joint Poster Contest Team will continue to research potential branching-out for future programs, including new funding sources, additional or alternative prizes, new poster display locations, and possible alternative formats (calendars, books, etc.) In addition, the team will assess the potential to develop new or expanded programs to engage middle and/or high school students in learning about water-related issues.

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***Above**: Images from 6th Annual Water Awareness Poster Contest* – (Left) *"Save Water – Lick Your Plate!" Winner: 4th Grade by Madeleine Ward;* (Center) *Final Judging Ceremony – West Pasco Government Center;* (Right) *Jeremy Castanza [FGUA] and Frank Galdo [PCU] of The Poster Contest Project Team presenting awards to winning students at Trinity Oaks Elementary School.*

For more information on this program, please visit www.watercontest.org.

2.11 TBW - Community Water-Wise Awards

Each year, Tampa Bay Water works in conjunction with regional utilities and the FFL™ Program to promote and coordinate the annual Community Water-Wise Awards. This program was designed to recognize individuals and businesses for creating and maintaining attractive, water-conserving landscapes utilizing Florida Friendly Landscaping™ practices. The program's judging criteria serve to highlight irrigation systems or techniques that minimize water waste and protect the environment, while simultaneously showcasing the aesthetic and wildlife-attracting potential that exists in the finest "Florida Friendly" landscapes.

For more information on this program, the judging process, and photos from past winners, please visit: http://tampabaywaterwise.org/

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3) Conclusion - A note on strategic planning approach:

As noted in the American Water Works Association (AWWA)'s *Conservation Communications Guide*, "awareness and even belief do not necessarily translate to a desired behavior. Conservation hinges upon an action." An effective program should therefore aim to provide the necessary motivation and information, as well as the means required for the target audience to engage and participate.

The AWWA *Conservation Communications Guide* also points out the importance of identifying and understanding each target audience, and tailoring both the messages and methods of delivery specific to their needs.

> *"In attempting to speak to everyone, there's potential to dilute the message so much that no one receives it."* – from the AWWA "Conservation Communications Guide"

In order to identify opportunities for conservation and efficiency programs, research has been conducted into the current state of such efforts in Pasco County, as well as the greater region. This research included the documentation and evaluation of current programs, the identification of relevant stakeholders and target audiences, assessment of potential barriers to implementation or participation, and determination of critical knowledge or information gaps. Pasco County Utilities continues to build upon the successes of its conservation and efficiency programs, while continuing to work with TBW and other regional partners to develop new ways to manage water demand for future generations of Floridians.

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For questions regarding the information contained in this document, please contact Frank Galdo, Pasco County Utilities Water Conservation & Efficiency Coordinator, at: fgaldo@pascocountyfl.net, or by phone at (727)847-8131 x6813.

Updated - December 21, 2015

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4) Appendix:

A) Demand Projections:

Pasco County has been a technical advisor to TBW's development of a long-term demand forecast model that provides projections of demand based on projected socioeconomic growth, meteorological conditions, and government policies implemented. The agency updates its demand forecast for each member annually to correct any future issues associated with changes in growth patterns and/or water use. Future demand, as projected by TBW's most recent Long-term Demand Forecast model, is provided in Table 2.

TABLE 2. Source: Tampa Bay Water Updated Regional Long-term Demand Forecast 2017-2040

Pasco Water Demand Planning Area (WDPA) - 2014 base year

Year	Pasco WDPA
2015[(1)]	25.8
2017	29.2
2018	30.0
2019	30.6
2020	31.0
2025	32.9
2030	34.2
2035	35.5
2040	36.6

1: Actual Demands for Water Year 2015

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Pinellas County Utilities Water Conservation Program Update
For Tampa Bay Water's 5 year Water Conservation Plan
2016 - 2020

Pinellas County Utilities (PCU) provides retail and wholesale potable water service to 665,000 citizens in our water demand planning area, which includes the cities of Clearwater, Oldsmar, Pinellas Park, Safety Harbor and Tarpon Springs. PCU serves 113,662 retail accounts. Of these, 80% or 90,421 are single family accounts, 13% or 15,249 are multi-family accounts (serving 135,562 housing units), and 7% or 7,992 are commercial accounts. As a result of PCU's successful water conservation education and outreach programs, per capita water use has significantly declined from 153 gallons per person per day in FY 1990 to 67 gallons per person per day in FY 2014/15. Total water production was 49 MGD in FY 2014/15.

In accordance with the reporting requirements of WUP No. 20011771.001 for Tampa Bay Water's Central System the following information is provided.

1. Reclaimed Water

a. North County Regional Reclaimed Water System

The William E. Dunn Water Reclamation Facility produces an annual average daily reclaimed water flow of 7.3 MGD. The reclaimed water is distributed for residential irrigation, golf course irrigation, and irrigation of other public access areas.

- The regional interconnects with Clearwater and Oldsmar have been operational for eight years. The annual average daily reclaimed water flow received from the interconnect system for this time period was 0.7 MGD. This supplemental flow has been instrumental in meeting the increased demands from our system wide expansion.

- PCU has implemented mandatory seasonal restrictions on reclaimed water use. This demand management strategy will be utilized with other strategies in order to balance supply and demand on the system.

b. South County Regional Reclaimed Water System

The South Cross Bayou Water Reclamation Facility is an advanced wastewater treatment facility that produces an annual average daily reclaimed water flow of 11.71 MGD. The reclaimed water is distributed for residential irrigation, golf course irrigation, and irrigation of other public access areas.

- The County provides reclaimed water on a wholesale basis to the cities of Pinellas Park, South Pasadena, and St. Pete Beach. There are a total of 23,107 wholesale and retail reclaimed water customers connected to our South County Reclaimed Water System.

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- The County has implemented mandatory seasonal restrictions. This demand management strategy will be utilized with other strategies in order to balance supply and demand on the system.

- The County continues to evaluate the potential of aquifer storage and recovery as a means of storing seasonally available excess reclaimed water.

Pinellas County Utilities has been operating a new customer service computer information system for the past eight years. This complex system is responsible for providing customer information such as consumption data from billing records and customer connection rates. We have provided the best information available to us at this time, and continue to refine data within the customer information system database.

It is still estimated that the total build-out of the north and south County reclaimed water systems will result in approximately 32,000 customers utilizing 33 MGD of reclaimed water to offset approximately 6.9 MGD of potable water use.

2. Ultra Low Flow Toilet Rebate Program

Pinellas County's Ultra Low Flow Toilet (ULFT) Rebate Program was completed in July 2010. This nine year program received cooperative funding from the Pinellas-Anclote River Basin Board of the Southwest Florida Water Management District.

Over the life of the program, 106,263 high flow toilets were replaced with low flow units within the retail water service area of Pinellas County and within the service areas of our wholesale water customers; the cities of Clearwater, Oldsmar, Pinellas Park, Safety Harbor, and Tarpon Springs.

The ability to quantify water savings over the life of the program was an important measurement of the program's benefit to the County and its citizens. One year of water use data prior to, and one year after toilet installation was collected as the raw data for the water saving analysis. The program achieved an estimated 2.8 million gallons of potable water savings per day. The program surpassed the original water conservation goal of 2 million gallons per day of potable water savings through the replacement of 93,000 high flow toilets.

Due to the significant down turn in the economy and the resultant decline in Utilities' revenues, the County is unable to continue to fund the ULFT Rebate Program. Although the program was discontinued, the effort was very successful, and we continue to realize potable water savings from the ULFT Rebate Program installations.

2.a. Toilet Flapper Replacement Education Program

Tampa Bay Water and its members successfully implemented the ULFT Marketing and Implementation Strategies Program. This long term education program's main objectives are:

- Retain savings of existing rebated and installed ULFT's by identifying and overcoming public barriers to flapper replacement.

- Provide information to the industry and the public on proper selection and installation of chemical resistant, well fitting, water conserving replacement toilet flappers.

- Increase public awareness of the importance for matching the correct replacement flapper to the toilet's designed flushing capabilities.

The brochure describing leak detection and proper replacement flapper selection and installation was provided to participants in the ULFT Rebate Program and will continue to be one of the publications available to our customers. Flapper replacement information has been added to our leak detection brochure that is an element of the information sent to customers with high bill complaints, and information on flapper replacement is posted on the Utilities web site.

3. Fixture Retrofit

Over the past 20 years more than 300,000 water saving retrofit kits have been distributed to PCU customers, saving 2-3 million gallons of water per day. These kits included low flow showerheads, low flow faucet aerators, toilet displacement bags, and leak detection tablets. Kits will continue to be distributed until current stock is depleted.

4. Clothes Washer Rebate/Replacement

PCU does not currently offer a large appliance rebate, i.e. low volume clothes washers. As has been expressed by other member governments, Pinellas County has concerns about the potential of the rebated appliance not staying at a residential property where the rebate was initiated.

5. Dishwasher Rebate/Replacement

PCU does not currently offer a large appliance rebate, i.e. low volume dishwashers, but may evaluate this option in the future for the commercial sector.

6. Irrigation and Landscape Evaluations

PCU does not currently offer irrigation and landscape evaluations but may evaluate this option in the future.

6a. Florida Style Landscaping

This education program is a partnership between UF/IFAS Extension Pinellas County, and the St. Petersburg Water Resources Department.

This is a six-week series of classes that is offered approximately every 8 months. The goal is to reduce outdoor water usage regardless of the irrigation source through education on:

- appropriate amounts of water necessary to maintain a healthy lawn and landscape

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- proper use of mulch to reduce the amount of water needed by plants
- grouping plants with similar watering needs in order to water more efficiently
- the proper use of fertilizer and pesticides

Practical information on these four points provides our customers with comprehensive, easy to understand information on outdoor water conservation measures they can easily implement.

6b. Florida-Friendly Landscaping™ Program

PCU works with the Florida-Friendly Landscaping™ (FFL) environmental education and action program designed to teach and promote environmentally-friendly landscaping practices. Residents learn techniques in water conservation, pollution prevention, and shoreline protection.

During FY 15, Florida-Friendly Landscaping™ educators and volunteers in Pinellas County reached 7,104 residents through 222 outreach events. Information on this program is also posted on the web site. Television, radio, and website education accounted for 400,943 potential contacts.

The Community Outreach Program works with individuals and small groups of homeowners to recognize and address areas needing enhancement in their community. The project groups receive education in a classroom setting as well as outdoors in their landscapes. Hands-on opportunities for learning in the landscape help to reinforce the lessons learned in the classroom.

The FFL Program also offers a Florida-Friendly Yard Recognition Program, which offers homeowners an opportunity for recognition of their landscapes that meet the Tampa Bay area's high standards of environmental excellence.

Rainwater harvesting workshops teach residents the importance of collecting and reusing rainwater that falls on their site. Fifty-five gallon rain barrels are available for purchase at workshops if residents do not want to build their own system.

A variety of other workshop topics are presented to community groups as requested.

7. Irrigation/Landscape Rebate

PCU does not currently offer rebates for modification of irrigation systems to increase standards or rebates to modify landscapes to a more water efficient landscape, but may evaluate this option in the future.

7a. Alternate Water Source Rebate Program

Pinellas County's Alternate Water Source (AWS) Rebate Program was completed in September 2010. The program provided rebates to customers using potable water for irrigation when they installed an alternate water irrigation source including deep wells, shallow wells, and surface water withdrawal systems. This program received cooperative funding from the Pinellas-Anclote River Basin Board of the Southwest Florida Water Management District. The

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program provided for District reimbursement to the County of 50% of each rebate given, with each rebate not to exceed $300.

Over the eight year life of the program, PCU provided 1,904 rebates saving 199 gallons per day per customer. Participation in this program met 60% of the program goal providing 378,896 gallons per day of potable water savings. Due to the significant down turn in the economy and the resultant decline in Utilities' revenues, the County is unable to continue to fund the AWS Rebate Program. Although the program was discontinued, the effort was very successful, and we continue to realize potable water savings from the AWS installations.

7b. Soil Moisture Based On-Demand Controllers

PCU has partnered with the Southwest Florida Water Management District and the University of Florida Institute of Food and Agricultural Sciences (IFAS), Agricultural and Biological Engineering Department to evaluate the potential of soil moisture based on-demand irrigation controllers. From August 2008 to July 2009, fifty-nine homes utilizing potable water with an automatic in-ground irrigation system voluntarily participated in the study. Homes were categorized into four unique experimental treatments within the study area. Historical water use was analyzed to distribute high and low irrigation use homes evenly across the treatment areas. The treatment classifications were as follows:

- SMS - soil moisture sensor system, coupled with the time-clock irrigation controller.
- RS - a mini click rain sensor coupled with the time clock irrigation controller.
- MO - comparison group and without any special control technology other than the existing time clock irrigation controller.
- EDU - current irrigation system with an added mini-click rain sensor as well as educational materials with time clock run times for a given time of the year based on IFAS recommendations.

The SMS treatment yielded the greatest savings at 65% less water applied than the MO treatment.

The next phase of the project, evaluating soil moisture sensor technology where reclaimed water is the irrigation source, has begun.

8. Cistern/Rain Water Harvesting Rebate

PCU does not currently offer a cistern/rain harvesting rebate program. Cistern/rain harvesting technology has progressed somewhat in recent years, and potential applications may be evaluated by the County in the future.

9. Pinellas County Pilot ICI Water Conservation Project

The Pinellas-Anclote River Basin Board of the Southwest Florida Water Management District cooperatively funded the Pinellas County ICI Water Conservation Program. After issuing four rebates over several years totaling $26,598.00, Pinellas County cancelled the program due to lack of interest from the ICI community.

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9.a. Industrial/Commercial/Institutional (ICI) Water Audit Program

The Commercial Industrial Water Audit Program provided water use audits to non-residential water customers in order to educate them on the value of water conservation. The audit included an analysis of their water use history, installation of flow meters to determine the quantity of water being used in target areas, and an inventory of types of fixtures currently in use in areas such as kitchen facilities, bathrooms, laundries, and cooling towers. The CIWUP recommends the following measures:

- Improved cooling tower efficiency
- Water efficient commercial ice machines
- Water efficient commercial spray nozzles
- Improved commercial dish washing machines
- Improved commercial laundry machines
- Use of low flow toilets and urinals
- Using monitors and meters on automatic swimming pool refilling devices
- Using monitors and meters for landscape irrigation evaluation

The County is not currently conducting water audits due to budget cuts and departmental reorganization activities.

9.b. Pre-Rinse Spray Nozzle Replacement Project

Pinellas County's Pre-Rinse Spray Nozzle Replacement Project was completed in 2010. This program received cooperative funding from the Pinellas-Anclote River Basin Board of the Southwest Florida Water Management District. The program provided for District reimbursement to the County of 50% of the cost of each low flow nozzle installed.

The project targeted the replacement of 583 traditional pre-rinse spray nozzles with low flow spray nozzles in the food service industry, which included restaurants, hotels, retail facilities, health care facilities, hospitals, and schools at no cost to the water customer. The low flow fixtures were offered to commercial customers who receive their water supply directly from the County or from the County's wholesale water customers, the cities of Clearwater, Oldsmar, Pinellas Park, Safety Harbor, and Tarpon Springs. The program also focused on educating commercial customers on other potential water saving measures that could be implemented at their facilities.

The water savings at each facility receiving a replacement low flow spray nozzle was determined by measuring water use immediately before and after installation of the spray nozzle. An analysis of these results for various types of facilities showed that an average of 193 gpd per nozzle was saved. Approximately 560 spray nozzles were replaced over the life of the program saving 108,080 gallons of potable water per day.

Due to the significant down turn in the economy and the resultant decline in Utilities' revenues, the County is unable to continue to offer the free replacement of high flow commercial pre-rinse spray nozzles with low flow units.

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9.c. Water Conservation Hotel and Motel Program (CHAMP)

This joint education program between Pinellas County and the Southwest Florida Water Management District began in 2002. Hotels and motels were invited to participate in a 'linens and towels reuse program' where the facility launders linens every third day of a guest's stay, unless otherwise requested. Printed materials for guest rooms and educational materials for employees were supplied by the District. Educational workshops on water conservation in the hospitality industry were also provided. Selected hotels and motels received a water audit from Pinellas County Utilities.

The County is not currently participating in the CHAMP program due to budget cuts and departmental reorganization activities.

10. Florida Friendly Landscaping

Florida Friendly Landscaping sites have been created with organization affiliation/partnerships in various public places such as along the Pinellas Trail.

11. Water Conservation Education

PCU's ongoing education efforts in the area of water conservation have been essential in lowering the per capita water usage among our customer base. The value gained through sharing a common theme of water conservation with other organizations helps to ensure the maintenance of the established water savings. PCU participates and supports various organization affiliation/partnerships through events that focus on public outreach/education on the importance of water resources and water conservation.

- Florida Friendly Landscaping™ – organization affiliation/partnership
- Speaker's Bureau
- Expos, Fairs, and Festivals
- AWWA Drinking Water Week – Proclamation by the Board of County Commissioners
- Water Conservation Month – Proclamation by the Board of County Commissioners
- Educational materials
- Press Releases
- Enterprise Village & Finance Park
- Internet – available to all Internet users – average of 77,000 visitors per year
- Facility Tours – available upon request
- Conservation Bill Stuffers (UtiliTalk)
- Healthy Lawn Educational Outreach Initiative – available to all Internet users
- Pinellas County will continue to pursue water conservation educational opportunities, and encourage customers to install water efficient fixtures, and install alternate irrigation sources.
- Social media (Facebook, Twitter, YouTube)
- Email Distribution (Constant Contact)

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12. Water Conserving Rate Structures

PCU currently charges a conservation fee of $1.00 per thousand gallons that is applied to those accounts that exceed their average usage calculated using the consumption of each billing period excluding any period from the calculation when the consumption is more than 20% above their average. When the consumption exceeds the 120% threshold average, the conservation fee is added to the bill.

13. Water Restriction Enforcement

PCU has a proactive water restriction enforcement program with one full-time water conservation compliance officer and administrative management provided by one enforcement supervisor. Patrol coverage is performed seven days a week during different shifts by working a flexible schedule to provide varied coverage throughout the week as needed. The District returned to Year-Round Conservation Measures in August 2014. The enforcement team averages 230 staff hours a month on enforcement activities and has issued 773 violations and 71 citations from October 2014 through September 2015.

14. Multi-family Residential Metering

PCU is responsible for supplying potable water to the customer up to and including the water meter. PCU has multi-family customers that have chosen to sub-meter the individual units on their property. The apartment/condo management company who pays for the purchase of water from PCU is responsible for the sub-metering and any associated costs. The HOA may charge each of their units a billing charge, but may only charge water use based on the actual cost of water purchased from PCU. From a conservation perspective, utility sub-metering and billing provides an effective measure to quantify and monitor individual unit water usage. Research shows that many property owners have not pursued a sub-metering investment for the following reasons:

- Capital costs of the metering equipment
- Concern regarding the payback period
- Concern about resident response
- Administrative time and effort required for monthly utility billing

It is at the sole discretion of each property to determine if it would be beneficial and cost effective to implement sub-metering.

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City of St. Petersburg
Water Conservation Initiatives 2016

The City of St. Petersburg has recognized the importance of water resource protection since the early 1900's when the City's growing water demands exceeded its local water supply. As the community continued to grow, the City required a reliable water supply and accordingly was forced to look inland, locating new drinking water sources outside of City limits. The City's Comprehensive Plan includes policies that require the Water Resources Department to develop and implement water conservation initiatives. Since 1989, these initiatives have helped reduce the City's average yearly water demand from a high of 41 mgd to a low of 27.5 mgd in 2011 (a thirty-three percent reduction). With a notable low per capita water use average of 78 gpd in 2015, the challenge for the City's water conservation program is maintaining this low rate in light of redevelopment initiatives and changing demographics.

The objectives of the Water Resources Department's water conservation program are to:

- reduce potable water consumption by providing cost effective incentives to all water use sectors,
- present unified conservation messages to all water use sectors, and
- educate residents and businesses on methods to conserve all water resources.

Water conservation initiatives designed to meet these objectives are categorized into the five main groups listed and described below.

I. <u>Operational Programs.</u> These programs provide the means for water customers to implement water conservation measures.

Toilet Replacement Program. This Southwest Florida Water Management District (SWFWMD) cooperatively-funded program offers qualified customers a rebate for the replacement of high volume toilets with ultra-low flush (ULF) toilets that use 1.6 gallons per flush (gpf), or with high efficiency toilets (HETs) that use 1.28 gpf or less. Since 1997, over 33,000 toilets have been replaced at over 27,500 locations. Starting in 2014, a new SWFWMD requirement for rebating only EPA WaterSense labeled fixtures installed in single and multi-family locations was instituted; webpages, ads and other outreach measures now identify and promote the change and the increased benefits of using WaterSense labeled fixtures.

The Water Resources Department administers this Program "in-house" to maintain a high customer service standard and meet programmatic goals. The Department has implemented improvements that expedite customer response and participant reimbursement, delivers accurate record-keeping, and expands the use of electronic capabilities. An example is the ToiletRebateOffice@stpete.org email address utilized to serve customers who prefer to utilize electronic technology. Other Program enhancements include detailed Program guidelines for distribution and downloading from the "Current Conservation Programs" webpage. Fillable forms that interact with the toilet rebate database are used by Program representatives to expedite

correspondence. As a result of the use of these initiatives, customer service, rebate processing, and resource efficiency have been enhanced.

Leak Detection & Flapper Education. Program efforts since 2005 have included educating customers about proper maintenance practices to assure that low flush toilets remain water efficient. To ensure that long-term conservation goals are met, the City provides educational materials on leak detection and proper replacement flapper selection and installation to Toilet Program participants. In addition, this information has been used in a tabletop display that facilitates distribution of the brochure and leak detection tablets to the public. To date, approximately 30,000 brochures and leak detection tablet packets have been distributed.

Sensible Sprinkling Program. This Program is designed to reduce current and future demand by educating customers about the efficient outdoor use of water sources as approximately thirty to fifty percent of household water consumption is attributed to outdoor water use, mostly irrigation. This SWFWMD cooperatively-funded education and outreach program provides an avenue for water customers to become knowledgeable about their sprinkler system's efficiency. Participants are provided a no-cost sprinkler system evaluation and installation of a rain sensor, a detailed efficiency report that corresponds with a drawing of their sprinkler system's layout, educational materials and an automatic shut-off hose nozzle. A qualified irrigation contractor was contracted by the City to complete the evaluations, rain sensor installations and efficiency reports.

While potable and reclaimed water users participated in Phase 1 (from 2001 to 2004), subsequent participants included private well water users. This inclusion supports efforts to encourage conservation practices and prevent over-utilization of this alternative water resource. Expected outcomes from increased efficiency of well water systems include the protection of natural systems, prevention of problems associated with overuse of the surficial aquifer, and increased availability of this alternative resource to customers currently using potable water for irrigation.

To date, over 2,090 single family, multi-family, and commercial sites have received sprinkler system evaluations and site-specific modification suggestions to improve the efficiency of their system. Additionally, over 1,760 rain sensors have been installed at no charge to the customer. Notable is that through all phases, this Program has effectively installed rain sensors at eighty-five percent of the audited locations. Due to the success of a similar effort for the Toilet Program, in 2015 a dedicated email account (SensibleSprinkling@stpete.org) was created to serve customers who prefer to communicate using electronic technology.

Indoor Plumbing Retrofit Kits. Since 1992, the City has distributed over 149,000 indoor water conservation kits containing low volume showerheads, faucet aerators, leak detection tablets and indoor water conservation literature such as the Toilet Flapper brochure. When practicable, EPA WaterSense labeled products are distributed. This Program is on-going and available to walk-in customers, water audit customers and event participants throughout the year.

Rain Sensor Give-away Program. Since 1996, the City has encouraged outdoor water conservation by providing over 8,165 rain sensor devices to qualified water customers. This Program is on-going and available to walk-in customers, event attendees and participants in the Sensible Sprinkling Program. Utility bill inserts, educational displays, the water conservation webpages and newsletter articles promote the program. In an effort to overcome a known customer barrier to implementing this modification, a tabletop display is used to demonstrate the method and ease of wiring a sensor to a controller.

Industrial, Commercial, and Institutional (ICI) Water Use Efficiency Program. The City offers non-residential customers educational materials and water-conserving devices and fixtures (rain sensors, aerators, leak detection tablets, and showerheads). In addition, participation in other operational programs is encouraged, and indoor and outdoor water audits have been offered to these customers. Numerous non-residential and multi-family site managers receive multiple packs of toilet leak detection tablets each year to support their pro-active efficiency efforts.

Pre-Rinse Spray Valve Replacement Program. This program provides, at no cost to food service industry customers, a more water-efficient pre-rinse spray valve that is utilized to clean food from dishware. Customers include restaurants, schools, retail food establishments, hospitals, care facilities, hotels, and businesses with cafeterias. Conventional pre-rinse spray valves use from 2.6 to 4.0 gallons of water per minute and are responsible for up to fifty percent of total dishwashing water use in this industry. Water efficient pre-rinse spray valves use approximately 1.6 gallons per minute or less, and generally clean dishware better and faster than traditional spray valves. Educational information on other ICI water conservation practices complements this conservation program. To date, approximately 325 spray valves have been distributed to 220 facilities.

II. <u>Regulatory Programs.</u> These programs are designed to encourage water conservation through consumer awareness and education, as well as enforcement of watering restrictions and other ordinances.

Watering Restriction Compliance Program. Begun in 1994, trained and certified City staff travel throughout the City observing and recording watering restriction violations. Watering restriction violations are classified as Class II municipal ordinance violations through the Pinellas County Court System. Unless prohibited by a SWFWMD Water Shortage Order, St. Petersburg issues warnings for the first violation; subsequent violations are subject to a fine schedule with a current base fine of $193. Additional fines and fees may be assessed by the court, up to a maximum of $500.

Water Conservation Landscape Ordinance. Section 16.40.060 of City Code relates to landscape and water efficient irrigation systems on residential and non-residential properties. This ordinance and its amendments require landscape and

irrigation plans for new development. Water conservation practices prescribed in the ordinance include selection of appropriate plant materials, removal of invasive exotic plants, water efficient techniques in landscape and irrigation systems, and appropriate landscape maintenance. In 2015, certain provisions were updated to support the use of micro-irrigation and other Florida-friendly landscape and low impact development (LID) principles, and drought-tolerant plants.

Reclaimed Water Emergency Restrictions Declaration. Section 27-170 of City Code provides the Mayor and City Council the authority to declare mandatory restrictions on reclaimed water use during critical situations. During such shortage declarations, reclaimed water use is restricted to three times a week (during specified hours) for 90 days. The City Council may extend, modify or terminate any reclaimed water restrictions established by executive order. Violators are subject to the same penalties as violators of potable watering restrictions, as mentioned above. Prior to critical situations, when measurements reach specific designated thresholds, messaging to reclaimed water customers is increased, including direct mailings, press releases, and notifications to neighborhood and civic associations.

III. <u>Economic Incentives.</u> These approaches are designed to promote water conservation by revealing the true cost of purchasing, treating and distributing high quality water to customers.

Water Conserving Rate Structure and Outreach. In 1985, the City became one of the first public water utilities in Florida to establish a water-conserving rate structure, as required by the City's Comprehensive Plan. This rate structure triggers the cost of water to become increasingly more expensive during months of increased demand. As an additional conservation incentive, sanitary sewer rates are based on water usage with no outdoor water use cutoff. Rate increases, which can also lower potable demand, have occurred over the past few years.

In 2009, St. Petersburg added a fifth tier to its water-conserving block rate structure. This tier applies to single-family residential customers using over 20,000 gallons of water per month and is intended to send a price signal to customers who use potable water for more than the typical domestic uses. The total volume charge is 100% higher than the fourth tier rate. To assist high water users with reducing consumption, the High Water User Outreach Project continues as part of the customer outreach initiatives. This project analyzes consumption histories for single family residential customers who exceed the 20,000 gallon-per-month threshold, then offers water efficiency audits and one-on-one education to this small group of customers. Tracking of consumption history and participant feedback are used to measure the success of this Project.

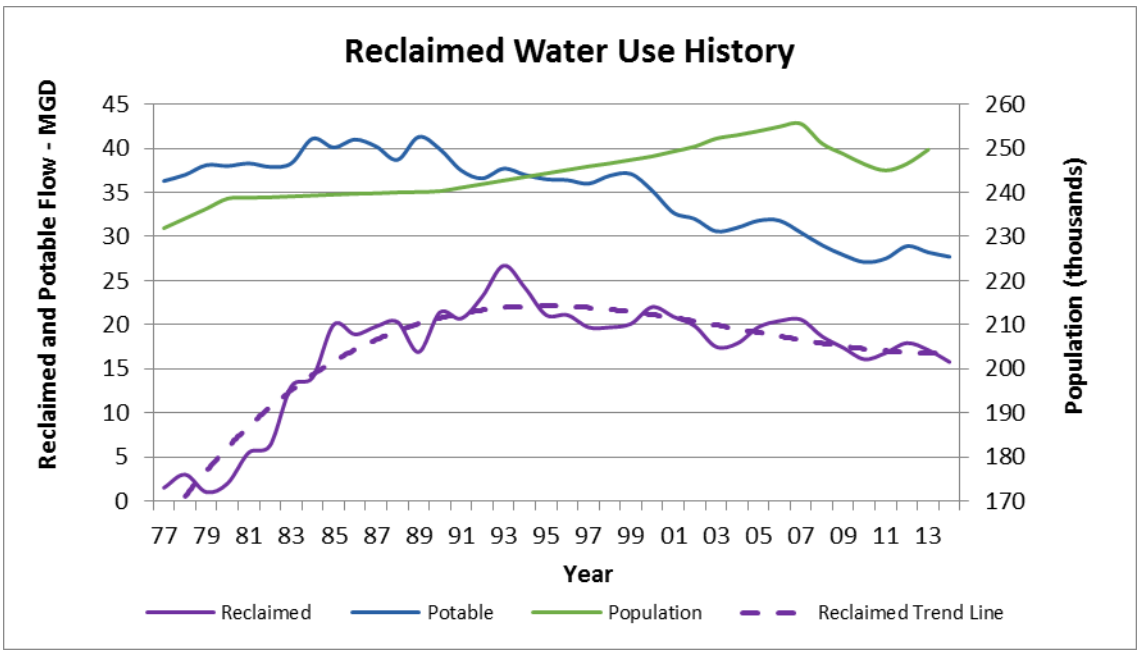
Meter Inspection and Replacement Program. The City recognizes that aging meters become less reliable and under-record water usage. More than 9,300 meters are inspected, serviced and/or replaced yearly to accurately record usage and minimize water loss from illegal hookups, leaks, and improper operation. Accurate measurement minimizes unaccounted for water loss and increases customer

conservation awareness through financial motivation. More than $500,000 is spent on leak detection, and meter repair and replacement each year.

IV. <u>Alternative Water Sources.</u> The use of alternative water sources for outdoor use and other purposes reduces potable water demand and helps protect the environment and conserve regional water resources.

Reclaimed Water. St. Petersburg is a national leader in the development and use of reclaimed water. More than 10,000 customers use this alternative water source for irrigating lawns and landscapes. Some non-residential customers also use reclaimed water for industrial purposes such as in cooling systems. To maximize the use of reclaimed water, a goal of the water conservation program is to encourage and educate consumers regarding responsible and efficient use of this water resource. For example, participation in the Sensible Sprinkling Program (which includes the installation of a rain sensor at no charge to participants) has been offered to reclaimed water customers since 2001. Methods employed to enhance system efficiency during dry weather include the construction of additional above ground storage tanks, aquifer storage and recovery, and reducing distribution system pressure during peak evaporation times during the day. The Reclaimed Water Liaison encourages service connections in supply "challenge" areas where reclaimed water service could be made available at minimal public and private cost. The Liaison and Water Conservation Coordinator collaborate to provide water use efficiency education to current and future users.

As illustrated in the chart below, conservation measures along with educational and incentive programs promoting irrigation efficiency have yielded a reduction in both potable and reclaimed water use. Reclaimed water consumption has declined from a high of 26.7 mgd in 1993 to 15.8 mgd in 2014.



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- ***Reclaimed Water System Storage and Automation –*** The Water Reclamation Facilities have ground storage tanks to assist with meeting diurnal demands which utilize SCADA control and monitoring capabilities to maximize storage and pumping efficiency to meet customer demand.

- ***Reclaimed Water Aquifer Storage and Recovery System (ASR) -*** The first ASR well at the Southwest Water Reclamation Facility (SWWRF) completed five years of cycle testing and received a FDEP operating permit in 2011. This SWFWMD cooperatively-funded project provides a seasonal storage component of reclaimed water to complement the short-term component provided by storage tanks. This allows the City to store water during the rainy season and recover it during the spring dry season when reclaimed water demands are at their highest. Additional ASR wells may be constructed in the future.

- ***REclaimed Water Aquifer Recovery on Demand (REWARD) Project -*** The REWARD well at the Albert Whitted WRF site recovers surplus reclaimed water that was previously stored underground using deep injection wells. This well provides a short-term peaking supply for the reclaimed water system during the dry season, when demand for reclaimed water is at its greatest. It operates under a SWFWMD Water Use Permit which allows the well to be used during the spring dry season at a rate of up to 1.2 million gallons per day with a cumulative limit of 25.3 million gallons annually.

Private Well Registration Program. A private well registration program was started in 2001 to allow customers to voluntarily register their wells. The resulting database assists with identifying favorable locations for future private well installations. This program has collected information on approximately 7,600 wells to date.

V. Education.

St. Petersburg recognizes that the core of an effective water conservation program includes ongoing education and outreach efforts. Utilizing community based social marketing concepts in these efforts appears to facilitate early and continued implementation of water conservation practices (known as "behavior change"). To reach all audiences, water conservation messaging is delivered via a broad spectrum of opportunities. These efforts include support of other local educational initiatives such as those conducted for the Florida-friendly Landscaping™ Program (FFL), and at Weedon Island Preserve and the Lake Maggiore Environmental Education Center at Boyd Hill Nature Preserve. Initiatives continue to evolve with new ideas, partnership opportunities, and interactive technologies designed to attract new audiences, including those that do not normally participate in environmental protection programs.

Florida Style Landscaping Workshop Series. This public education project was conceived by the water conservation office in 2009 and is held at least once a year at the Water Resources Department's "green" administration building. The *Series* comprises six nights of presentations and hands-on activities conducted by subject-area specialists from the Pinellas Extension, Native Plant Society, Florida Irrigation Society, Boyd Hill Nature Preserve and the City's stormwater

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pollution prevention program. The venue's Florida-friendly demonstration garden is used for tours, displays and hands-on activities. One *Workshop Series* was conducted in spring 2015, educating 248 attendees. Each workshop was very well received by the public, with 23 people attending four or more of the six classes. The next *Series* is scheduled to start in January 2016.

Rainwater Guardian Workshops. Scheduled to being in spring 2016, this new City-sponsored initiative will provide rainwater collection education to City residents, along with free rain barrels and rain garden plants. Numerous workshops are planned at several venues in different areas of the City in order to reach residents who had not participated in rain barrel or rain garden classes in the past. Project Goals are to:

- encourage and educate residents about water conservation and stormwater runoff prevention techniques that retain and collect rainwater on site, and
- empower residents and facilitate the use of rain barrels, rain gardens and other on-site rainwater collection techniques.

Project partners include St. Petersburg's Engineering and Capital Improvements; Stormwater, Traffic and Pavement Operations; and Community Services Departments. A specialist from Pinellas County Extension's FFL Program will consult with and conduct portions of the Workshops based on scheduling and availability.

Marketing and Promotion. The promotion of water conservation news, and education and incentive programs includes a variety of methods including "e-news" posts to distribution list members; press releases to media outlets; messaging in utility bill inserts and St. Pete TV bulletin boards; and brochure development.

Electronic Newsletter. In December 2011, an electronic newsletter entitled "*Water Wise eSplash*" debuted to subscribers interested in receiving water restrictions and conservation reminders, tips and news by email. This initiative became a vital resource for subscribers during periods with once-a-week watering restrictions by providing regular and timely updates. Interest in the electronic newsletter has grown substantially, to 2,100 subscribers. These subscribers include officers of local civic, business, environmental and other associations that pass along information to their neighbors, customers and partners. Neighborhood and civic associations utilize *eSplash* articles in community newsletters. Popular subjects include plant selection, new technologies and techniques, leak detection and repair, and repairing sprinklers. The average "open rate" for *eSplash* remains higher than the industry average, at 34%.

Water Conservation Webpages. The dedicated water conservation page (www.stpete.org/WaterConservation) contains links to all subject-area webpages and associated information. The City debuted a new reformatted website design in March 2015 that included the grouping of links and pdf downloadable files

such as program application forms and guidelines. A link to subscribe to the *eSplash* electronic newsletter is also provided. Information regarding the conservation programs, watering restrictions and resource links is updated regularly. Google Analytics tracking in FY15 identified 8,946 visits and 7,299 unique views of the main Water Conservation webpage. The independent Watering Restrictions webpage received 4,550 visits and 4,176 unique views. The average visitor viewing time was just under three minutes on each of the main water conservation pages, which is a notable measurement. In addition, the Watering Restrictions Fact Sheet, Sensible Sprinkling Application, and *Drought Tolerant Groundcovers* brochure were three of the top twenty downloaded files from all City water-themed webpages. The translation of web pages into Spanish and other languages is available to help educate and inform non-English speaking residents about water conservation programs and practices.

St. Pete TV. During the period from October 2014 to September 2015, water conservation-related videos were broadcast 341 times. These videos include re-broadcast of SWFWMD Governing Board meetings and relevant videos produced by organizations such as the Tampa Bay Estuary Program and the American Water Works Association. The video *Sensible Sprinkling* provides step by step demonstration of basic irrigation system repairs such as making controller adjustments, performing catch can tests, replacing and moving sprinkler heads and cleaning filters. Another video, *Turfgrass Alternatives*, discusses the methods used to minimize lawn areas and solve landscape problems by installing drought-tolerant ground covers. To assist viewers with proper plant selection, numerous plant alternatives are offered in the video, along with their photos, descriptions, site requirements, and growth characteristics. Providing YouTube links to shorter video segments of these and other specific topics in editions of *Water Wise eSplash* and on the water conservation webpages has proven to be a successful means to reach a different audience. The videos are also provided to program partners, local educators, and pertinent City departments, and are broadcast during events and presentations.

Customer Service. The City employs representatives in many departments whose customer service responsibilities overlap either occasionally or on a regular basis. An ongoing effort provides current water conservation program information to these employees to enhance public services and facilitate productive communication between customer service personnel. For instance, recipients in the *water conservation email group*, including administrative officials, are updated regularly about watering restrictions changes and programmatic efforts. Many staff members have subscribed to *Water Wise eSplash*. Brochures and fact sheets are distributed regularly to community centers and customer service counter locations for display and distribution. Water conservation videos are provided to educate staff members and customers. Additionally, the water conservation coordinator provides conservation-related updates to key personnel in other departments such as Utility Billing and Collections, Parks and Recreation and Codes Compliance Assistance. Department employees, the City's ambassadors to the public, are provided informational business cards for public distribution that contain key contact information. Partnerships with business and civic groups such as the Chamber of

Commerce, St. Petersburg's Council of Neighborhood Associations (CONA), and individual businesses and neighborhoods assist with disseminating water conservation and watering restrictions information and attaining customer feedback for program enhancement.

Educational Materials. The Water Resources Department continues to develop and disseminate a variety of educational outreach materials to support water conservation, water quality and efficient reclaimed water use efforts. Continuing efforts include providing information and displays at City Hall, Sunken Gardens, the Boyd Hill Nature Preserve Environmental Education Center, and other venues; participation at events and public forums concerning water issues; presentations at community events and to neighborhood, civic, and other associations; the development and production of educational brochures and information sheets; and the creation of demonstration gardens.

The "*Landscape Plant Guide for Yards with Reclaimed Water*" and "*Sensible Sprinkling"* brochures remain popular items and are distributed in lobby displays, at local events and upon request. The regionally-developed leak detection and flapper education brochure "Solving the Mystery of the leaky flapper" is distributed at area outreach events and lobby displays, effectively reaching customers who have not participated in the Toilet Replacement Program. Leak detection dye tablets are also provided with this display during outreach events. The detailed "Guide to Micro-Irrigation" and "Rain Barrels: A Homeowner's Guide" are distributed to homeowners, contractors and local government employees during educational programs and as requested.

The *"Do It Yourself Sprinkler System Checkup Guide"* remains popular; this publication facilitates consumer understanding of their individual irrigation systems and practices that improve sprinkler system efficiency. It includes step-by-step visual inspection and calibration instructions and a water-proof checklist for handy on-site usage. Formatted as a file folder, it can hold irrigation documents and other outdoor watering publications and be easily stored for future use. Laminated inserts provide images and step-by-step instructions for implementing common irrigation system modifications and repairs such as elevating, replacing and moving sprinkler heads. Designed to support educational programs conducted by Extension Service and other water conservation educators, it has been utilized for the following types of workshops: micro-irrigation, Florida-friendly landscaping™, stormwater runoff prevention, Florida Style Landscaping, and irrigation efficiency.

In 2014, the water conservation coordinator produced the brochure "*Drought Tolerant Ground Covers for Your Landscape*". This publication is designed to introduce consumers to native and non-native, drought tolerant ground cover plants that can be utilized instead of turfgrass in a landscape. Color photographs and brief descriptions of ten plants, information on native plants, plant installation steps and a contact list of plant nurseries in southern Pinellas County complete this brochure. The brochure is distributed at outreach and educational events. A downloadable pdf of the brochure is a popular item on the water conservation webpages and in the *eSplash* electronic newsletter.

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Water Conservation Recognition. The City of St. Petersburg, with Tampa Bay Water, its other member governments and the Florida-friendly Landscaping™ program, co-sponsor the *Community Water Wise Awards*. This program recognizes outdoor water conservation efforts by awarding the highest scoring properties in residential, multi-family, commercial, governmental, builder and school categories at the annual City Beautification Awards Ceremony. The Water Resources Department supplies applications to residents through various methods, including area community centers, landscape contractors, and other venues. It also promotes the program on the website, during presentations, in the *eSplash* newsletter, and (when available) in utility bill inserts. A tabletop display provides further promotion during events and at specific venues. In 2015, the City had one winner in the residential category; descriptions and photographs of the winning landscapes are posted on the Tampa Bay Water Wise website (managed by Tampa Bay Water).

Youth Education. Educating future decision-makers is an enduring part of the City's water conservation program. Development of a conservation ethic in youth also has the benefit of educating parents, families and teachers about water conservation practices. Activity and coloring books are provided at local outreach events, in displays, and upon request to educators and youth. A rain barrel display is available for use by teachers and educators and brought to water conservation presentations and events throughout the year. School and summer camp presentations and tours are offered to pre-school through high school children. School-based programs, educational activities and displays, literature, incentive programs, and other resources are also available to all schools and youth agencies in the City. Employees in the Water Resources Department participate annually in the Great American Teach-In by providing presentations to elementary through high school students on topics such as water conservation, water quality and public works job opportunities.

The interactive display called the "*Water Conservation Dollhouse*" was introduced in 2014 as a tool to stimulate conversation between children and adults about household water use. A home water use audit checklist and indoor water conservation tips fact sheet accompanies this exhibit. The display remains very popular during events, including the Green Thumb Festival and the St. Petersburg Science Festival (held in concert with Marine Quest). In addition, the concept and design have been replicated (and improved upon) by two utilities in the Tampa Bay region.

Green City Initiatives. St. Petersburg's long record of water conservation initiatives played a vital role in helping it become the first city to attain Silver certification as a Green Local Government in 2007. The Florida Green Building

BACK

Coalition (FGBC), an independent non-profit organization established in 2000 to promote green building in Florida, designates Green Cities and Green Counties for outstanding environmental stewardship. With the goal of setting the “green standard” for Florida municipalities by advancing to platinum level certification, several City departments have incorporated sustainable products and practices into everyday operations. In 2015 the water conservation coordinator became the Water Resources Department’s appointee to the City’s Green Team, a group of departmental representatives tasked with initiating and tracking sustainability efforts within their departments.

The Water Resources Department’s LEED gold-certified Administration Building continues to be a vital part of St. Petersburg’s Green City Initiatives. Educational and informative signs, workshops on various topics, indoor and FFL demonstration garden tours, and plant identification signs in the demo garden educate visiting individuals, groups, and employees about LEED principles, stormwater runoff prevention and Florida-friendly gardening practices. This demonstration garden concept, including educational signs, has been adopted by the St. Petersburg Parks Department and used at City Hall.

Recognizing the opportunity to promote water conservation programs and practices to the public through City employees and other departments, the water conservation office has been involved in various City projects. Activities include serving as a resource advisor for water-related purchases, and new building and renovation designs; meeting with water efficiency companies and consultants offering services and products to the City; conducting training for employees; reviewing drafts of ordinance revisions, publications and other water and environment related documents; attending events and workshops; and sharing displays with other departments. Examples include the testing and incorporation of WaterSense labeled plumbing devices in all new and renovated city facilities and encouraging contractors and consultants to register as “green” vendors on the Purchasing and Materials Management Department’s website.

The water conservation coordinator continues to conduct water efficiency audits at City facilities. An audit report for a facility provides consumption history and water efficiency suggestions to the facility’s department. Common concerns identified during the audits include tampering with faucets and aerators; water theft; mismatching of fixtures; prioritizing fixture replacements; and minor and major leaks. Water consumption histories continue to be tracked and charted for facilities. Where practicable, departments implement the efficiency suggestions and execute proactive measures such as switching to alternative water sources for irrigation and operational processes, and employing water-efficient tools and devices. The Parks and Recreation Department continues self-monitoring of potable water consumption at its facilities. The Sanitation Department, in response to an audit report suggestion, converted the water supply at their truck pre-wash station from potable to reclaimed water (a final power rinse with potable water is still conducted); within six months 400,000 gallons of potable water had been saved and the conversion costs had been recovered. The conversion at Water Resource Department wastewater facilities and pump stations from potable to reclaimed water for operational

processes and cleaning has greatly reduced consumption. Plans for 2016 call for continuing these partnerships and initiatives, including the use of alternative water supplies for operational processes.

As a result of City Council visioning and Executive Order #2016-07 by Mayor Kriseman, the City has embarked on an effort to incorporate sustainability practices and goals into everyday business, and future planning and projects. The Water Resources Department's and water conservation program's previous and future initiatives play a vital role in tracking and implementing these concepts. Current efforts include utilizing the STAR (Sustainability Tools for Assessing and Rating Communities) rating system to establish a baseline of previous and current initiatives and policies.

BACK

Hillsborough County
Florida

5-Year Water Conservation Plan (2016 – 2020)

Continued Implementation of the U. S. Energy Policy Act of 1994

Hillsborough County has adopted an advanced plumbing code, prior to the effective date of the U. S. Energy Policy Act of 1994 (EPACT), and continues to support efforts at facilitating further implementation, such as "WaterSense", similar to the Energy Star labeling program. The Hillsborough County Public Utilities/Water Resources Division became a promotional member of EPA's WaterSense Program during FY2014, and routinely distributes replacement showerheads and faucet aerators with water use efficiencies exceeding the requirements of EPACT. For example, whereas the EPACT limits the water use for showerheads, bathroom and kitchen faucet aerators to 2.5 gallons per minute (gpm), Hillsborough County currently purchases showerheads with a flow rate of 2.0 gpm, and aerators with maximum flow rates of 0.5 gpm for bathrooms and 2.2 gpm for kitchens. For Fiscal Years 2011 and 2012, the County awarded a bid to purchase 30,000 showerheads and bath aerators, and 15,000 kitchen aerators. This inventory is continued to provide will-call needs through 2015. Additional showerhead purchasing is budgeted in Fiscal Years 2016-2017.

Fixture Retrofit

In cooperation with the Alafia River, Hillsborough River and Northwest Hillsborough Basin Boards of the Southwest Florida Water Management District, Hillsborough County conducted a retrofit program through neighborhood canvassing during the 1994-1996 period. 47,000 retrofit kits were distributed door-to-door during this campaign with the District. The County continues to provide faucet aerators, showerheads and toilet tank leak detection tablets to interested parties during community events where the Public Utilities Department may have a display table set up, and for walk-in customers at its service centers. The Public Utilities Department has progressed from the distribution of in-tank volume displacement devices for toilets to providing incentives in the form of rebates for the voluntary replacement of higher volume toilets with new toilets using no more than 1.6 gallons per flush (see the next section). The Public Utilities Department plans to conduct a commercial kitchen pre-rinse sprayer replacement program during this plan's timeframe, and has purchased 1,000 fixtures to do so with. The first emphasis of this project is through the Department's FOG (Fats, Oils and Grease) monitoring program in commercial establishment venues, although this is a difficult venue as the FOG team is typically visiting an establishment regarding regulatory infractions. A second venue presented itself in FY 14, in the form of outreach through the Extension Office Nutritional Health Education program.

Motion Sensor Faucet and Toilet Flush Mechanism Research

In cooperation with the California Urban Water Conservation Council, as an agent for the American Water Works Association's Water Use Efficiency Division, the Public Utilities Department funded a study of pre- and post-installation of motion sensor operated faucets and toilet flush mechanisms in an office building in Tampa. This type of equipment, while highly acceptable due to its hygienic nature, is questionable as to its water conservation benefit. Manufacturers are touting the water savings of the equipment meanwhile, and pressuring water conservation professionals (and their respective senior management officials) to include retrofit of facilities with the equipment as a facet of their conservation programs. This one-of-a-kind research will provide much needed information about the efficiency of the equipment. The study concluded in 2008 and results were published in 2010. See the March 2010 report entitled "Sensor-Operated Plumbing Fixtures. Do they Save Water?" for a summary of the work. Report attached hereto.

Irrigation and Landscape Evaluation

Hillsborough County utilizes the services of the Cooperative Extension Service to augment its water conservation staff to conduct irrigation and landscape evaluations. Water consumption data is provided to the Extension Office for those properties undergoing these evaluations. This service is announced on the utility billing occasionally. The County participates in Tampa Bay Water's annual Water Wise Awards program.

Irrigation/Landscape Rebate

Hillsborough County Public Utilities Department funds low volume irrigation grants to neighborhood associations through the Office of Neighborhood Relations (ONR). This funding is to provide for the installation of, or conversion to low volume irrigation at neighborhood entries or within community association common areas. Use of this funding is currently restricted from private properties. Participation requires the use of a licensed irrigation contractor holding membership in the Florida Irrigation Society, and registered with the County as an approved vendor, carrying appropriate levels of insurance. Annual budget of $67,500 for this effort, accommodating twenty-seven (27) or more installations, at a maximum of $2,500.00 each. The ONR has been funding landscape mini-grants in addition to this.

Toilet Rebate/Replacement

Hillsborough County has had a successful ULV Toilet Rebate Program since 1994, providing incentives to accelerate the voluntary replacement of 83,774 older, higher volume fixtures at 58,481 locations through September 2015. Qualifications for participation are that; 1) property must be a water customer (as opposed to a wastewater-only customer) of the Hillsborough County Public Utilities Department, 2) the property must be older than 1995 (with few exceptions where a construction permit may have been pulled earlier), and 3) any and all rebates are subject to limitation by previous rebates issued to the same property. The participation rate had dropped off considerably in 2007, to the point where the program was discontinued with the termination of contract with an outside vendor, effective December 21, 2007.

Upon discontinuation of the program, public outcry suggested that rekindling the program would be in the best interest of furthering easily attainable water savings; thus, after obtaining Board of County Commissioners support in June, 2008, the Public Utilities Department renewed the program, running it internally, with a budget to issue 500 rebates annually. Having issued 4,473 separate rebates since then, the County has realized a savings of $203,521.50 in management fees. Staff intends to continue budgeting for this program as indications are there remain a significant number of properties yet to participate, including large multi-family locations. Furthermore, as the County takes over franchise utilities (having done so with Calm Harbor, Cypress Cove, East Lake, Fairview Village, Pebble Creek and San Remo in FY2015), many of those new customers will be eligible to participate in the program. During FY2014, the County registered this program with EPA WaterSense.

The following chart details rebates by year and user classification (SF = Single-Family; MF = Multi-Family; Comm = Commercial Properties) through September 2015. The rebate dollars of $9,435,418.31 do not include management fees paid to the independent contractor for their services (an additional $2,457,364.00), nor do the costs include any advertising, staff time, postage, promotional activities or disposal of old toilets.

Hillsborough County Toilet Rebate Activity by Year and User Classification									
	Toilets			Units (locations)			Rebate Dollars		
	SF	MF	Comm	SF	MF	Comm	SF	MF	Comm
1994	410	0	0	268	0	0	$41,000.00	$0.00	$0.00
1995	6,176	235	154	4,159	176	75	$707,105.55	$22,006.70	$14,936.31
1996	16,803	3,160	497	11,589	2,345	377	$2,021,598.89	$306,811.47	$45,929.38
1997	10,543	3,684	290	7,449	2,498	281	$1,295,808.08	$356,843.08	$28,604.18
1998	9,989	1,648	272	6,945	1,299	241	$1,156,321.11	$164,815.92	$26,688.54
1999	6,004	511	97	4,188	336	89	$675,986.95	$38,387.08	$9,680.06
2000	2,989	1,322	27	2,231	904	17	$350,629.43	$132,255.00	$2,700.00
2001	3,430	807	840	2,534	561	323	$408,130.17	$80,717.08	$83,888.15
2002	1,800	12	82	1,231	11	68	$191,047.62	$1,146.58	$8,168.89
2003	1,657	8	148	1,158	4	127	$179,552.64	$640.54	$14,782.77
2004	1,445	61	239	1,026	61	209	$154,631.50	$6,100.00	$23,893.63
2005	1,231	13	147	858	11	108	$128,519.52	$1,267.05	$14,692.56
2006	645	78	46	435	76	33	$66,895.92	$7,400.00	$4,600.00
2007	1070	53	254	736	43	207	$113,038.22	$5,300.00	$25,328.21
2008	294	37	212	208	6	11	$31,733.10	$3,825.00	$21,000.00
2009	619	3	0	453	1	0	$65,105.66	$270.00	$0.00
2010	682	1	2	472	1	2	$70,473.28	$125.00	$216.97
2011	617	19	19	429	1	5	$62,947.45	$1,900.00	$1,896.00
2012	333	0	0	203	0	0	$33,321.44	$0.00	$0.00
2013	377	2	47	259	2	3	$53,690.12	$213.32	$4,700.00
2014	479	515	0	331	357	0	$48,105.95	$51,500.00	$0.00
2015	629	7	3	439	5	6	$65,542.11	$554.13	$450.00
	68,222	12,176	3,376	47,601	8,698	2,182	$7,921,184.71	$1,182,077.95	$332,155.65
		Total Toilets	**83,774**	Total Rebates		**58,481**		Total Rebate Dollars	**$9,435,418.31**
								mgmt fees: 54,008 @ $45.50:	$2,457,364.00
								Total Program Hard Costs	$11,892,782.31

Soil Moisture Sensor Rebate

In preparation of the budget for FY16/FY17, the Public Utilities Department is including a measure to incentivize the installation of soil moisture sensors in irrigation systems. It has been since 1998 that a rebate program to install technology in an irrigation system to gain water saving has been offered by the County, prior to the research efforts of the University of Florida Institute of Food and Agricultural Sciences on rain sensors and soil moisture sensors. Initial planning of this measure is to offer rebates at up to $200.00 with a goal of issuing 120 rebates annually.

Clothes Washer Rebate/Replacement & Dishwasher Rebate/Replacement

Hillsborough County remains concerned about the portability of these appliances and the uncertainty that rebated appliances will remain installed at the location after the occupant relocates, eroding water savings if removed. There is no mandated water use efficiency for these white goods, as there is for toilets, faucets and showerheads; therefore it is not a requirement that the public meet these non-existent standards. Given the considerable price differential to purchase models of these appliances with greater water use efficiencies, it may be more cost effective to provide incentives to the manufacturers or retailers to leverage the cost to the consumer. This would best be done on a National level.

Cisterns/Rain Water Harvesting Rebate

In cooperation with the water management district, Hillsborough County has developed a Homeowners Guide to Rainbarrels brochure and companion VHS video, with an intention to re-release on DVD. This is provided to interested parties. The Extension Office routinely conducts rain barrel workshops where attendees gain knowledge of the basic principles of rain water harvesting and have the opportunity to purchase rain barrels at a discounted price. The County's Stormwater Management Division has also, in cooperation with the District, constructed an operational cistern at the County Courthouse in downtown Tampa. This is the extent to which the County currently promotes rain water harvesting.

Conversion to Automated Meter Reading

During 2008 the Public Utilities Department gained approval to implement a ten-year program to convert its entire customer base to AMR/AMI. As this program rolls out, the Public Utilities Department will be enabled to identify potential leaks and inefficiencies of use at its customer premises. This program remains on hold for 2016.

Industrial/Commercial/Institutional Audits and Repair

Hillsborough County funds Project C.H.A.M.P. aimed at promoting water use efficiency within the local lodging industry. The planned replacement of commercial kitchen pre-rinse spray valves will gain further water savings within the hospitality industry and additional water savings within the local school district. As a condition of SWFWMD Emergency Order SWF 01-14, the County hired the John Daily Florida Institute of Government (FIOG) to conduct water audits of the 30 largest ICI customers of the Water Department. Even though the Emergency Order was subsequently rescinded, FIOG completed the work and developed water conservation plans for the participating facilities. It is the intention of Hillsborough County to maximize implementation of recommended actions identified by FIOG as resources allow.

Florida-Friendly Landscape Principles

Hillsborough County's Land Development Code (LDC) addresses landscaping of improved lots within the County. During 2002, the LDC was amended to require irrigation systems to be designed and constructed to Florida Irrigation Society standards. Hillsborough County Public Utilities Department supplements Tampa Bay Water's funding of the Florida-Friendly Yards (FFY) Program at approximately $61,230 annually.

The FFY Program anticipates conducting 10-15 Rain Barrel Workshops annually, reaching from 500-750 clients and distributing 1,000 – 1,500 rain barrels. The FYN Program forecasts 10-15 Landscape Design Workshops each year, reaching 200-300 clients annually. The FYN Program plans on conducting 15-20 Water-Wise Workshops to promote micro-irrigation annually, reaching 375 – 500 clients and distributing 150 – 200 micro irrigation kits.

Water Conserving Rate Structures

Potable and Wastewater Charges

Hillsborough County continues the use of a four-tier water rate structure as implemented June 2003. The rate structure is as follows, effective June 1, 2015:

Water use	Charge/unit*	Base Charge	Waterwater Charge/Unit**	Wastewater Base
Tampa Bay Water	$2.93			
0 – 5,000	$0.69	$8.42	$4.38	$13.61
5,001 – 15,000	$1.92		$4.38 to 8,000 gallons	
15,001 – 30,000	$3.21			
30,001 >	$4.80			

* Does not Include Tampa Bay Water pass through charge

** Capped at 8,000 gals (8 units)/ equivalent residential connection

Additionally, there is a $4.05 bill charge per billing.

SF Reclaimed Water Committed Class

Monthly Charge: $9.00

SF Residential Metered Reclaimed Water Charges

Water use	Charge/unit	Base Charge
0 - 5,000	$0.26	$4.00
5,001 – 15,000	$0.42	
15,001 >	$0.57	

Multi-Family Residential Metering

Hillsborough County assumes liabilities when entering private properties, therefore, the Public Utilities Department will not provide incentives for multi-family properties to individually meter the housing units. Notwithstanding this, in discussions with property managers of such locations, the Departmental staff encourages sub-metering of those properties in the interest of conservation, when the reading of the sub-meters is conducted by a third party and the main property remains master-metered for billing purposes from the County. The Public Utilities Department participated in the National Multiple Family Submetering and Allocation Billing Program Study, available as a downloadable report at http://www.aquacraft.com/sites/default/files/pub/Mayer-%282004%29-National-Submetering-and-Allocation-Billing-Study.pdf .

Weather-Based Irrigation Controller Research

Following a presentation from Hydropoint Data Systems in August 2004, the Water Conservation Technical Advisory Committee recommended that Public Utilities Department undertake a local study of these irrigation controllers to evaluate their effectiveness in local weather conditions and soil structures. Negotiating with the University of Florida Institute of Food and Agricultural Sciences through the Florida Department of Consumer Affairs, a two phased project was designed, conducted and is now completed at the UF Gulf Coast Research and Education Center and within the existing customer base of

the utility in three separate neighborhoods. The first phase tested three different technologies against a time-based controller, and a time-based controller set at 60% ET deficiency, with four replications of each treatment in side-by-side landscape plots. The second phase looked at existing high to excessive customers, and matched pair landscapes to study the equipment in the real world. The work is complete and results suggest that while the technologies may be viable for larger landscapes with continual monitoring, it is not practical for the Public Utilities Department to develop a rebate program to encourage widespread installation of these technologies.

Educational

The Hillsborough County Public Utilities Department supports numerous educational initiatives aimed at imparting knowledge of Florida's water resources amongst various targeted audiences including the following:

- Cooperation with the Arts Council's In-School Water Theatre Arts Program
- Speakers Bureau
- Radio Advertisements
- Project Water CHAMP (Water Conservation in Hotels And Motels Program)
- Senior Citizen Water Education Training
- Printed Brochures
- Attendance w/Display at Town Hall Meetings
- Attendance w/Display at Community Events
- Annual Neighborhood Conference
- Annual Earth Day Events
- Website presence
- Annual Newspapers In Education Publication
- Promotion of Conservation Through Artwork
- 4-H Youth Water Camp
- Annual Great American Teach-In Event
- Bi-annual Condo & Homeowner Association Exposition
- Fix-A-Leak Week
- Hillsborough School District – Nature's Classroom
- FS/AWWA Drop Savers Poster Contest
- FS/AWWA Model Water Tower Competition

Water Restrictions Enforcement

Hillsborough County continues enforcement of mandatory water use restrictions for all properties within the unincorporated county area, regardless of that property's water source. Although we have not yet disaggregated this measure from all others, we feel strongly that this is an effective measure at managing demand. Such a disaggregation is expressly too costly, unless undertaken by a student working on thesis material. During Fiscal Year 2006, the Public Utilities Department gained BOCC approval to redirect processing of violations from the Clerk of the Circuit Court to Code Enforcement/Special Magistrate. The implementation of that change occurred in the first quarter of Fiscal Year 2007, which restores collected penalties and fees to the Water Conservation Reserve Fund. Collected penalties are deposited into a water conservation trust fund, available to further water conservation efforts as approved by the

Board of County Commissioners. Assuming this responsibility, the development of an accurate tracking system for enforcement activity and revenue collection was necessary.

During 2013 the enforcement activity was transferred from the Public Utilities Department to the Code Enforcement Department. At time of necessity, the entire Code Enforcement staff can be made available to concentrate on water restrictions enforcement.

Tampa Water Department
2015 – 2019 Water Conservation Program

Background and Introduction

To provide a dependable alternative to a scattered system of poor quality wells, the City of Tampa constructed a dedicated water treatment facility adjacent to the Hillsborough River in 1924. The facility, which is a designated American Water Landmark, is known as the David L. Tippin Water Treatment Facility. On average, the Water Treatment Facility produces around 90 percent of the 77 million gallons of water per day that is consumed by Tampa Water Department customers.

In 2000, the plant was restored to its original Moorish-Spanish decor, and, while the architecture of Tampa's original water treatment plant has been preserved, the treatment process continues to change and improve as technology advances. The plant houses Florida's only municipally-owned, state-certified, complete drinking water laboratory. Throughout the treatment process, continuous and complete water analyses ensure that Tampa's water quality exceeds all State and Federal standards. The Tampa Water Department is the only Florida-located water utility and one of 13 water providers in the United States that was recognized in 2013 with a 15 Year Directors Award for delivering superior quality drinking water to customers.

In 1989, in response to rapid population growth, record drought conditions and projected future water supply deficits, the Tampa Water Department (TWD) implemented a formal Water Conservation Program. Since its inception, the program has grown to a multi-faceted effort that includes operational, programmatic and policy measures.

Tampa's Water Conservation activities are part of a long-range water conservation program that incorporates the goals of responsible stewardship of Tampa's water supply, limited reliance on the regional water resources to augment Tampa's water needs during dry periods, and the use of appropriate business practices to safeguard the fiscal well-being of the Tampa Water Department while retaining already achieved water use efficiencies and contributing to:

- Future economic development and growth while protecting local and regional water resources,
- Reduction or deferral of costs associated with of maintaining and expanding water delivery, treatment, and disposal systems, and
- Reduction of energy and maintenance costs of TWD facilities.

Potable Water Use

The TWD water supply system provides water to industry, wholesale accounts and residential customers within Tampa's water service area, which extends into Hillsborough County in some areas. Tampa records and analyzes consumption data and reports the data to Tampa Bay Water and to the Southwest Florida Water Management District.

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Retail Customer Classifications

Customer classifications differ in their characteristics relevant to water use. Single family (SF) and multi-family (MF) accounts reflect strictly residential water use. The average monthly demand for Tampa's single family residential accounts is 5,984 gallons (8 ccf). Single family homes typically have irrigated, individually landscaped yards, and those in deed-restricted or similar planned communities may also have any of a variety of observed irrigation configurations ranging from individually-metered, self-controlled to individually-metered, association-controlled to association-metered and association-controlled. Deed restricted and similar planned communities within the Tampa service area also include irrigated landscape common areas similar to the common-area landscaping found at multiple-family residential units and upscale businesses in our community, with water sourcing ranging from metered potable to pond and lake water to District permitted wells. Non-residential accounts include government/public water use in parks, prisons, government buildings, and medians; offices, businesses, shops, restaurants and hotels, and industrial use in production and manufacturing processes.

System-Wide Historical Use

Since 1989, when Tampa launched its formal water conservation program, the total population served by the TWD increased virtually every year until 2010, when the number declined. Following that decline, Tampa's population has experienced slight upticks annually and has returned to near 2004 levels while annual pumpage values remain suppressed. Revisions to methods of calculation, as required by our permitting agency, the Southwest Florida Water Management District, also resulted in a change in the per capita values. A history of average pumpage per capita and adjusted use per capita is shown in Table 1.

Consumptive water use frequently is expressed in gallons per capita per day (GPCD) or the average gallons used per person per day. Per capita values shown in Table 1 are calculated for Tampa's functional population, which includes not only residential and business customers but commuters, tourists, and other non-residents who use water in Tampa while here temporarily for business or pleasure.

Table 1 History of Average Pumpage Per Capita and Adjusted Use Per Capita

Fiscal Year	Average Pumpage (MGD)	Population of Service Area	Gross Use Per Capita (GPD)	Gallons Exported Water (GPD)	Adjusted Use Per Capita (GPD)
1989[1]	75.12	463,402	181	N/A[2]	N/A[2]
1990	70.32	468.458	150	N/A[2]	122
1991	67.48	475,000	118	644,000	N/A[2]
1992	70.77	423,878	122	664,602	103
1993	67.48	426,425	157	594,734	119
1994	67.39	429,518	152	701,206	116
1995	65.59	431,520	151	813,806	118

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1996	68.47	434,067	146	1,977,000	123
1997	76.26	449,206	152	1,661,410	129
1998	80.27	493,232[3]	139	8,657,951	116
1999	70.91	495,872[3]	146	2,148,063[4]	121
2000[1]	61.29	536,437	132	1,301,915	114
2001[1]	Not available	Not available	139	Not available	111
2002	73.96	540,757	134	4,714,085	107
2003	76.07	590,828	117	3,839,391	96
2004	84.58	605,073	128	6,382,478	104
2005	80.05	655,993	113	4,949,581	92
2006[1]	84.04	647,131	122	2,804,071	103
2007[1]	79.02	653,837	120	2,832,962	100
2008[1]	81.24	657,313	117	1,772,020	99
2009[1]	65.05	648,577	101	3,420,136	101[5]
2010	75.48	559,752	116	3,164,138	N/A[6]
2011	75.49	587,684	113	2,338,712	N/A[6]
2012	75.26	587,782	112	2,324,294	N/A[6]
2013	68.84	590,523	106	2,301,266	106[5]
2014	71.61	603,107	112	2,279,368	109

[1] Low rainfall years

[2] Exported Water data and Significant Users data were not captured, nor did Tampa Water Department calculate an adjusted per capita prior to 1993.

[3] Estimated calculation of the population, which includes commuter work force entering the City.

[4] This includes North Tampa interconnect, which started at the end of FY98.

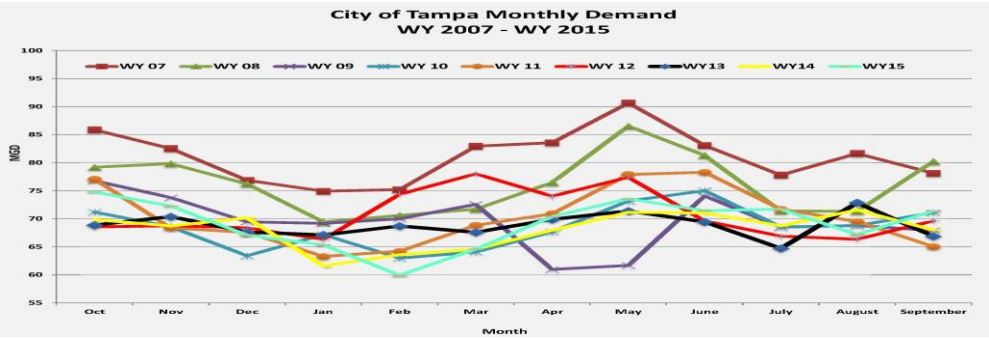
[5] Fluctuations in reported Adjusted GPCD may be attributed to periodic revisions to method of calculation for included variables.

[6] Method of calculation significantly revised for 2010 reporting year, which resulted in changes to reclaimed water and stormwater deductions. Those previously-included deductions affected the Adjusted GPCD.

City of Tampa Monthly Demand – Five-Year Perspective

Within the past eight years, as reflected in the Figure 1 below, Tampa's month-by-month water demand and its cumulative annual water demand continues seasonal fluctuations but remains below 2007 levels. The reduced demands are attributed, in part, to the City's active, comprehensive approach to water conservation and efficiency.

Figure 1. ***City of Tampa Monthly Demand FY 2007 – FY 2015***



Note: WY 2007 – WY 2015 designation in legend is th*e equivalent of FY 2007 – FY 2015. Values for April and May 2009 reflect demand during period when hand-watering only imposed to protect Tampa's primary source.*

BACK

Water Conservation Goals and Objectives

The overall goal of Tampa's water conservation efforts is to ensure a sustainable water supply to meet community demands during normal and emergency conditions. This section provides a brief description of water conservation activities and measures employed by the Tampa Water Department.

Operational Measures

Source and Finished Water, and Service Connection Metering

All raw water flows and finished water flows are metered. All existing service connections are metered and the City requires meters for all new connections. TWD meters all treated water delivered to its wholesale customers. These meters are calibrated annually. The TWD monitors meter activity through its Supervisory Control and Data Acquisition (SCADA) system.

Fixed-Interval Meter Reading

Meters for all Tampa water customers are read monthly. Locations where the recorded meter reading is outside a "normal" range is scheduled for a re-read to verify or correct the read, as appropriate. A self-help kit is available to locations with verified high reads to assist them in determining and addressing the possible causes of the high usage.

Meter Testing, Calibrating, Repairing and Replacing

The TWD Preventative Maintenance (PM) Team is responsible for performing all functions in respect to the operation and maintenance of Tampa's water meters. Tampa's policy is to replace residential meters after they have been in service for 10 years to ensure metering accuracy. To comply with that policy, approximately one-tenth of the residential meters in our system are replaced on an annual basis.

All 2-inch and larger meters in the system are field tested annually, and those that are not metering to within a range of 98 percent to 101 percent accuracy are recalibrated or, if necessary, replaced. The TWD also reviews existing meters at commercial locations as part of a "right-sizing" initiative to ensure that the meters installed at those locations are capable of recording demand at those locations with the highest degree of accuracy possible.

System Audit

To ensure minimal real and apparent system loss, the TWD monthly compiles and reviews data related to water production and metered sales to identify and respond to factors contributing to water loss.

Distribution System Pressure Control

Tampa maintains 35 continuously-monitored pressure stations around the system, connected to SCADA, to maintain the distribution system. There also are several pump stations and elevated tanks in place to assist in meeting peak demands. Each monitored station is equipped with minimum- and maximum-alarmed limits for pressure

to ensure that the system is maintained within the parameters established by the Health Department.

Recycled Water for Filter Backwashing at Treatment Plants

The TWD uses dual media filters at its water treatment plant that require routine backwashing. Air scouring is used to help dislodge material collected in the filter media, and backwash is then used to remove dislodged material to a thickener tank for reclamation. After settling in the thickener, the backwash water is recycled to the beginning of the treatment stream for reprocessing. Solids collected in the thickener are removed for dewatering and disposal. Water captured during the dewatering process returns to the beginning of the treatment train for reuse.

Customer Leak Notification

The TWD completes re-reads for locations where usage exceeded prior history normal ranges for a location and leaves door tags at locations where re-reads confirm high usage to alert customers of a possible leak on the customer side of the meter. Additionally, the TWD continues to explore the use of automated meter reading technology. It is anticipated that such a conversion would include the ability to establish earlier customer leak notification and high-use notification programs.

Water Conservation Coordinator

TWD maintains a staff of three full-time water conservation coordinator positions to plan, implement and evaluate its water conservation activities. The water conservation team is a part of the department’s Distribution and Consumer Services Division, which includes customer service and billing functions. The Conservation Section's close alignment with the Department's distribution division activities ensure the conservation team’s involvement in customer-focused.

Reuse Expansion

The Tampa Water Department continues to explore opportunities to increase the availability of reclaimed water for irrigation and commercial application and indirect potable use.

Aquifer Storage and Recovery

With ever-increasing water demands and seasonal variations in surface supply, it is challenging at times to provide solely from the river source for Tampa’s water demands. Tampa currently has eight Aquifer Storage and Recovery wells that store up to 1 billion gallons of water when excess surface water supply is available. The Tampa ASR system is operated seasonally, storing water during rainy periods and recovering when supplies are short.

Educational and Program Measures

Informative Billing and Water Bill Inserts

Each utility bill issued by the City of Tampa provides the customer with usage for the billing period. The usage is expressed in units and in gallons, rounded and expressed in 1,000 gallon increments, to assist the customer in comparing their most recent consumption with the information provided in the 13-month usage history included on the face of the bill. City of Tampa utility bills are mailed monthly to each customer at the mailing address designated by the customer. Additionally, customers may view and download current and past bills online.

In addition to the information routinely printed on Tampa's utility bills and the online bill view, the following information is featured on the water department's Web site:

1. Rate structures for each billing class,
2. An explanation of any water-related surcharges, including information about how the application of such surcharges is triggered,
3. Conversion information to assist customers in doing their own calculations to convert metered units to gallons, and
4. Three years of average use for all user classes to assist customers in comparing their water usage to other similar users in Tampa.

Tampa's billing process accommodates billing inserts, which are used to advise customers of available water conservation programs and water use restrictions. The TWD also offers customers the opportunity to subscribe to an electronic newsletter that delivers direct-to-their-email water conservation tips and information about available water conservation programs and water use restrictions.

Retrofit Kit Give-Away

Tampa water customers may request free Plumbing Retrofit Kits and Save Water Kits from the TWD. The Plumbing Retrofit Kit contains the following items: low flow showerhead, bathroom aerators, kitchen aerator, teflon tape, toilet leak detection dye tablets, installation instructions, the most recent Water Quality Report, and informational brochures. The Save Water Kits include toilet leak detection dye tablets, the most recent Water Quality Report, and informational materials on checking for leaks and conserving water. An average of 350 – 400 kits are distributed annually to residential customers with an estimated 2,000 – 2,500 kit content items being distributed in bulk to multi-family and business locations.

Rain Sensor Distribution Program

The TWD provides rain sensors to customers on request at no charge to replace a non-working sensor or to complete an initial installation.

Commercial Pre-Rinse Spray-Value Retrofit Program

The TWD offers free low-volume (1.28 gpm) pre-rinse spray valves to Tampa-located restaurants and locations with on-site commercial kitchens.

Industrial, Commercial and Institutional Water-Use Efficiency Evaluation Program

Since approximately 40 percent of Tampa's account base is non-residential, the TWD annually maintains an Industrial, Commercial, and Institutional Water-Use Efficiency Evaluation Program that offers both on-site assistance and a comprehensive self-guided evaluation template to help non-residential locations identify water efficiency measures and to incorporate them into a site-specific water conservation plan. The on-site portion of this program is structured in such a way that the customer is an active participant throughout the entire process to ensure that the customer gains not only the evaluation and an efficiency plan but also gains the ability to self-conduct on-going evaluations to ensure that gained efficiencies are maintained. This program also includes a series of industry-specific template documents to help industrial, commercial and institutional customers identify industry specific efficiency measures and options.

Water Use Surveys

To assist its customer base, the TWD offers a "customer care" program that provides referred customers with an on-site water use survey to assist with identification of leaks and/or other conditions that may contribute to increased water use and increased water and wastewater utility costs. As appropriate, customers are provided with water conservation information, water-saving devices and referred for additional in-house or external services through providers such as the Hillsborough County Extension Service. Through in-house referral, 42 on-site irrigation evaluations were provided to customers experiencing high levels of irrigation demand.

Public Information/Education

The TWD purchases and publishes a variety of brochures and other literature promoting water conservation and water use efficiency. Brochures provide information on water conservation issues, such as efficient irrigation, irrigation with reclaimed water, leak detection and repair, and indoor water conservation. In FY2015, the department also participated in 70 events at community locations in our service area and completed two community "walk-arounds," which included door knocks to distribute water conservation information and water-saving devices. The TWD also maintains a 24-hour, 7-day-a-week water conservation hotline that provides customers with current information regarding water use restrictions. In addition to the available brochures, the TWD maintains a Web site presence that features more than 100 pages of water conservation and water efficiency information and access to partner-sponsored water conservation programs and materials and uses social marketing tools, such as Facebook and Twitter to reach the widest possible audience within its service area. The Web-located information is designed to provide customers with on-demand access to every brochure published by the Department in addition to water-conservation programs and tips.

Details about TWD's water conservation and efficiency public information components are provided below:

- Pipeline (e-newsletter)
- WaterSense
- Rates, Fees and Billing Information
- Save Water Save Cash
- 7-Day Water Challenge

- Community Water Wise Awards
- Water Use Calculator
- Water Use Restriction Information
- Brochures (conservation tips, rebate programs, rates, and more)
- Plumbing Retrofit Kits
- Do It Yourself Sprinkler Checkup Guide
- Do it Yourself Rain Sensor Checkup Guide
- Irrigation Worksheet
- Put A Lid on Leaks
- Online Irrigation Calculator
- Seasonal Irrigation Scheduling Chart
- Soil Moisture Sensors
- Irrigation for New Lawns and Landscapes

Plumbing Workshops

To assist in addressing concerns associated with residential account customer-side leaks, the TWD is partnering with Erwin Technical Education Center in Tampa to provide tuition-subsidized plumbing and general home maintenance workshops for residential and commercial account holders. This program launched immediately at the start of FY2014.

Customer Surveys

Tampa periodically talks with or contacts prior conservation program participants by mail to collect information that will assist in evaluating programs and activities.

Workshops

The TWD cooperates with a variety of partners to sponsor rain barrel, Florida-Friendly landscaping and other water-conservation workshops around the community.

Wholesale Water Supplier Assistance Program

Tampa cooperates and coordinates with its wholesale customers in developing their Water Use Efficiency Plans and will continue to participate in and support those efforts.

Policy Measures

Conservation Rate Structure

The City of Tampa continues the use of an inclining tier rate structure, which is in place for all customer categories. In 2007, Tampa's City Council approved a five-year plan for annual rate increases, and, in accordance with that plan implemented increases for all customer classes in 2008, 2009 and 2010. Tampa's single family residential rate structure, which went into use in FY2011, remained in use throughout FY2015.

Tampa's Single Family Residential Rate Structure

			Inside City of Tampa	Outside City of Tampa
Tier 0	0 – 5	ccf*	$2.09	$2.61
Tier 1	6 – 13	ccf	2.43	3.03
Tier 2	14 – 26	ccf	4.07	5.08
Tier 3	27 – 46	ccf	5.44	6.80
Tier 4	47 +	ccf	6.28	7.85

First tier rates for non-residential customers are equivalent to the Tiers 1 – 4 and the usage in each tier is customer-class specific and based on threshold amounts established for specific types of use. For instance, the threshold rate for a hotel/motel customer is established based on the number of rental rooms the facility has. For a non-residential customer whose usage does not exceed the assigned threshold for that location, each unit of water metered is billed at Tier 1 rates; consumption the exceeds the threshold but does not exceed twice the threshold level is billed at Tier 2 rates; consumption that exceeds twice the threshold but does not exceed 3.5 times the threshold level is billed at Tier 3 rates; and consumption that exceeds 3.5 times the threshold level is billed at Tier 4 rates.

* *a ccf is equal to 748 gallons*

Landscape/Irrigation Ordinance

Chapter 27 of the City of Tampa's Code of Ordinances requires the use of Florida-Friendly landscape principles for the design of new landscape and includes these measures:

1. An incrementally reduction to the amount of irrigable turf allowed that caps that landscape component at no more than 25 percent of the total irrigated area after 2011 for new landscape installation.
2. Landscaped areas shall consist of at least sixty (60) percent native plant material and/or plant material adapted to local climatic and edaphic conditions.
3. A layer of mulch to a minimum depth of three (3) inches shall be specified on the site plan in plant beds and around individual trees in turf areas.
4. Sprays and rotors are required to have matching application rates within each irrigation zone, and mixed zones are not permitted.
5. All irrigation systems are required to be designed to avoid over spray, runoff, low head drainage, or other similar conditions where water flows onto or over adjacent property, non-irrigated areas, walkways, roadways, structures, or water features. And, emitters and sprinkler heads are encouraged to be located at

least two (2) feet from buildings and water should not hit the building while operating. Narrow areas (four (4) feet wide or less) are not to be irrigated unless low-volume irrigation is utilized.

6. Newly installed irrigation control equipment is required to include an automatic irrigation controller having program flexibility, such as repeat cycles and multiple program capabilities, a battery back-up or nonvolatile memory to retain the irrigation program(s), and an operable rain sensor or other device, such as soil moisture sensor, to prevent unnecessary irrigation.

Stringent Restriction Enforcement and Reduced Irrigation Hours

The City of Tampa stringently enforces all local and regional water use restrictions. In May 2006, the TWD moved to a citation on first observance of a violation policy in lieu of the issuance of warnings in an effort to increase restriction compliance and reinforce the message to Tampa water users that conservation is a year-round activity. Additionally, within its local water use restriction ordinance, Tampa reduces the permitted hours allowed by the Southwest Florida Water Management District (before 10 a.m. and after 4 p.m.) by two hours per day on scheduled irrigation days. Tampa does not permit irrigation between 8 a.m. and 6 p.m.

Low-Volume Fixture Ordinance

The TWD routinely distributes replacement showerheads and faucet aerators with water use efficiencies exceeding the requirements of EPACT. The TWD also is enrolled as a WaterSense partner, promoting the installation and use of efficiency-tested and rated water appliances and fixtures.

Rain Sensor Ordinance

The City of Tampa's water use restriction ordinance includes language that requires the use of an automatic rain sensor or other rain sensing technology for all automatic irrigation system.

Reclaimed Water Mandatory Hook-Up for Irrigation

All newly installed irrigation systems in Tampa must connect to reclaimed water when they are in a location where reclaimed service is available.

Conclusion

Tampa is fully committed to maintaining a comprehensive water conservation program that addresses our community's on-going need to ensure a safe, reliable water supply that meets demands during normal and emergency conditions. This commitment is realized through operational, programmatic and policy-related activities, and is fully integrated throughout the Water Department's business activities.

As a result of Tampa's long-term approach to water conservation and through engagement of Tampa's water users, since the inception of the program in 1989 total system demand and gpcd has declined significantly. The City remains committed to water conservation and the Tampa Water Department will build on

its past conservation successes and continue to update and revise its programs in order to remain at the forefront in the implementation of water conservation programs.

TAMPA BAY WATER
Supplying Water To The Region

Tampa Bay Community Water-Wise Awards 2015

The Community Water-Wise Awards program recognizes individuals and businesses committed to conserving water resources and protecting the environment by using the best in attractive, Florida-Friendly Landscaping™ as well as irrigation systems or techniques that minimize water waste. The program was developed by Tampa Bay Water and the Florida Friendly Landscape program in Hillsborough, Pasco and Pinellas County in 1998 and has grown in recognition and participation. The original program included specific criteria for new home development but was later switched successfully to a more comprehensive approach that recognizes a variety of outdoor water use type landscapes. Tampa Bay Water funds all program elements.

Annual program implementation occurs through interaction with Tampa Bay Water's member governments: Hillsborough, Pasco and Pinellas counties and the cities of New Port Richey, St. Petersburg and Tampa. Tampa Bay Water works with its member governments and the FFL program to develop and implement marketing strategies, update promotional and scoring criteria, and focus attention on evaluation of applicants.

The Water-Wise Awards program is designed to recognize attractive, water-conserving landscapes in various water-use sectors (e.g., homes, businesses, industry and government). Moreover, the program seeks to identify actual examples of outstanding Florida-friendly, water-wise landscaping and to promote those principles within the community. It is implemented in the spring dry season annually with applications generally accepted through the end of the dry season (June 30).

Once all applications are provided to Tampa Bay Water, either electronically (with pictures) or through mail-ins, they are distributed to the FFL program coordinators in each county. FFL program coordinators then screen the applicants to insure quality sites. They then work with Tampa Bay Water and its member governments to set up and conduct site evaluations, generally within a month or two of the deadline for submittals. Based on type of landscape (homeowners, business, government buildings, multi-family, schools, road way right of ways, etc), the top ranked applicants in each category and by member government are then notified of their winning status. Those entrants that did not win are provided with information that will increase their outdoor water use efficiency and enhance landscape quality. They can reapply the following year.

Tampa Bay Water works with the FFL coordinators to set up photo shoots at each winning site so the photos can be used to promote the results and landscape best management practices implemented. The agency also contracts to have either an award stepping stone made or a user friendly plaque for recognition purposes. FFL coordinators work with member government representatives and the awards are provided at city events or county commission meetings, with elected officials recognizing and providing the awards to

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recipients. This generally occurs in late fall to early winter and award winner promotion is used the following spring to promote the program.

Prior to program promotion the following year, existing scoring criteria is evaluated to promote objectivity and reduce subjectivity of scoring. The scoring criteria focus' heavily on supplemental water use efficiency, consistent with the program title, and also on FFL landscape principals. Text describing how to evaluate and score different categories is provided to maximize scoring intent. Finally, landscape aesthetic scoring is allowed to insure the landscapes promote proper maintenance, plant spacing, and maturity concepts are delineated.

2015 Award Winners- Photos

Pasco County

City of St. Petersburg

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Pinellas County


City of Tampa


Hillsborough County

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Fiscal Year 2015

Executive Summary Report

October 1, 2014 – September 30, 2015
Florida-Friendly Landscaping™ Program

December 2015

Prepared by:

Lynn Barber, Brian Niemann, FFL Extension Agents, Jim Moll, FFL Program Coordinator, Paula Staples, Doris Heitzmann and Chris Dewey, FFL Program Coordinators

UF/IFAS Extension Hillsborough, Pinellas and Pasco Counties

Acknowledgments

Florida-Friendly Landscaping™ (FFL) educators in Hillsborough, Pinellas and Pasco Counties would like to thank their respective Boards of County Commissioners and City Councils for their continued support of our mission to teach Florida-Friendly Landscaping™ practices to Tri-County residents. These practices conserve water and reduce pollution from stormwater runoff to protect our natural environment and are part of a sustainable lifestyle.

We would also like to acknowledge the long-term financial support by the Board of Directors of Tampa Bay Water. Tampa Bay Water continues to provide annual funding for the Florida-Friendly Landscaping™ Program in Hillsborough, Pinellas and Pasco Counties. In addition to providing funding, Tampa Bay Water also provides continuing education opportunities as well as promoting FFL principles in their public messaging.

Program Goals

"Preserving and protecting Florida's water resources is the focus of the Florida-Friendly Landscaping™ (FFL) Program, which promotes the nine principles with public outreach and education statewide. The nine principles of the Florida-Friendly Landscaping™ Program are:

- Right Plant, Right Place
- Water Efficiently
- Fertilize Appropriately
- Mulch
- Attract Wildlife
- Manage Yard Pests Responsibly
- Recycle
- Reduce Stormwater Runoff
- Protect the Waterfront

Two significant goals of the FFL Program are to promote healthy landscapes that conserve water and reduce non-point source pollution. This is accomplished through the use of teaching material developed by the University of Florida/Institute of Food and Agricultural Sciences (UF/IFAS) Extension specifically on these two topics and implemented locally by Extension offices throughout the state. The goal of the programs within the Tampa Bay watershed were developed to reduce non-point source pollution into the estuarine system as defined in the Tampa Bay Estuary program.

Program Structure

Organizationally, the FFL Program is part of the Urban Horticulture or Natural Resources Program areas within the Extension offices. Tampa Bay Water works with the FFL program in the Tri-County region to evaluate the existing scope of services to match current landscaping trends and concerns in the region.

- **Hillsborough County:** Lynn Barber, Urban Horticulture, FFL Program Leader and Agent, provides educational programming on water and environmental conservation according to the nine FFL principles, and reports to County Extension Director, Stephen Gran. Program Coordinators report to FFL Program Agent and include: Paula Staples, Public Education, providing education to high water consumers, Sheila Monahan, Water-Wise, providing education to water conservation enthusiasts, and Lisa Meredith, School and Community Gardening, Compost and Vermicompost, providing gardening and composting information to the community.
- **Pasco County:** Program Coordinators are under the guidance of the Horticulture Extension Agent and County Extension Director, Dr. Whitney Elmore. Jim Moll, Horticulture/Homeowner Education FFL Program Coordinator, educates homeowners on horticultural practices, water conservation and water quality utilizing the nine FFL Principles, coordinates and contributes to media coverage, and conducts educational presentations promoting FFL principles. Chris Dewey, Builder/Developer FFL Program Coordinator, teaches Pasco builders and developers about FFL concepts and irrigation technologies through site visits and works with Pasco Utilities to identify/target high water users for site visit interventions to promote irrigation techniques and water saving strategies.
- **Pinellas County:** FFL program is under the Natural Resources section of the Extension department. Jane Morse, Commercial Horticulture Agent, serves as Natural Resources program leader and provides guidance and consistency to FFL programming. Brian Niemann, Program Coordinator, provides educational programming on water and environmental conservation according to the nine FFL principles and Doris Heitzmann, Community Outreach Coordinator, teaches Homeowners/Community Associations, Property Managers and Board of Directors about FFL principles as they relate to water conservation.
- Master Gardeners and Horticulture Agents, Urban and Commercial, assist the FFL program throughout the year and Tri-County region. Master Gardeners assist by registering workshop attendees, providing answers to questions, distributing compost bins, microirrigation kits and rainwater harvesting devices post-workshops, managing exhibits/displays containing FFL information and providing other types of community outreach. Urban and Commercial Agents create and present at various FFL meetings, seminars and other functions as needed.

Advisory Panel Members and Their Roles

Tampa Bay Water requires the use of advisory panels to help guide and provide focus on various implementation strategies consistent with the overall intent of the program. The advisory committee is composed of representatives from each Tampa Bay Water member government, other local government departments that focus on stormwater, environmental sustainability, water quality, homeowner association board members, property managers, and/or small business representatives and citizen supporters. Tampa Bay Estuary Program was one of the original Florida-Friendly Landscaping™ Program creators and instrumental in aligning the main focus of the program (water efficiency leading to reduced runoff). The advisory committee offers an opportunity to build strong relationships with local government representatives, as well as industry and citizens from the community. These relationships result in more opportunities for further collaboration on programming and outreach.

Smart Objectives

The objectives of the Florida-Friendly Landscaping™ Program are to: reduce stormwater runoff, decrease non-point source pollution (flowing into Tampa Bay and the Gulf of Mexico) through workshops focusing on landscape best management practices and to conserve water. Water conservation programming is designed to increase water use efficiency of existing irrigators in each county with a specific focus on potable water use. FFL landscaping principles education seminars and workshops are used to; encourage increased use of drought tolerant plants, maintain or increase soil water holding capacity, and offer various UF/IFAS recommendations on how to increase water use efficiency, reduce storm water runoff and increase receiving water body water quality.

Strategies &Tactics

- Provide University of Florida science-based research as the basis of educational programming to county residents and entities
- Increase irrigation water use efficiency consistent with emphasis on source type
- Decrease non-point source runoff into surface waters
- Increase residents' knowledge of FFL principles regarding water and environmental conservation
- Expand programming that targets high water users to include builders, developers and others that impact water consumption

Impact of Results on Region

Table 1 is a compilation of efforts that occurred in 2015. Increased focus on water efficiency is reflected by estimated water saved during the year due to various programs offered. All program elements are consistently evaluated throughout the region and are compiled from individual county reports found in the chapters following the expanded summary. The dollar value of educational services provided was calculated using the average rate charged by for fee service vendors performing the same or similar services.

Table 1. Florida-Friendly Landscaping™ Program FY15

	HILLSBOROUGH	PASCO	PINELLAS	TOTALS
ESTIMATED/MEASURED GALLONS CONSERVED/YEAR	4,605,394	50,064,709	8,456,834	63,126,937
# OF FFL PRESENTATIONS/WORKSHOPS/COMMUNITY EVENTS	99	56	90	245
# OF FFL PRESENTATION/WORKSHOP/COMMUNITY EVENT ATTENDEES	3,250	1,318	2,604	7,172
% OF KNOWLEGDE INCREASE POST PRESENTATION/WORKSHOP	50	58	48	156
# OF FFL EXHIBITS/DISPLAY	32	12	6	50
# OF FFL EXHIBITS/DISPLAY ATTENDEES	8,934	15,936	414	25,284
# OF MULTI-MEDIA EVENTS	155	45	1	201
# OF MULTI-MEDIA EVENTS/REACH	1,000,000	1,000,000	379,305	2,379,305
# OF IRRIGATION EVALUATIONS	69	162	15	246
# OF SITE/LANDSCAPE VISITS/EVALUATIONS	58	2	36	96
# OF SITE HOA EVALUATIONS	15	2	42	59
#OF YARD RECOGITIONS INCLUDING COMMUINITY WATER-WISE EVALUATIONS	13	3	6	22
# OF INDIVIDUAL CONTACTS - PHONE, EMAIL & OFFICE VISITORS	11,619	2,769	3,305	17,693
# OF PUBLICATIONS DISTRIBUTED	50,803	6,711	2,565	60,079
# OF WEBSITE HITS	137,803	35,547	21,638	194,988
# OF MASTER GARDENER HOURS AS IN-KIND SERVICES	1,526	2,382	88	3,996
$ VALUE OF EDUCATIONAL SERVICES PROVIDED TO COMMUNITY (CALCULATIONS BASED ON FOR FEE SERVICES)	$573,543	$468,763	$145,470	$1,187,776

A series of significant workshops, events and evaluation metrics were undertaken or developed in 2015. They include:

1. The Tri-County Stormwater Pond Maintenance Workshop, October 30, 2014, was a full day event with 69 community association board members, property managers, members from local government and the pond care industry attended. The purpose was to educate stakeholders about the purpose of and responsibility for stormwater ponds and how to maintain them. Topics covered included: Purpose and Economics of Ponds, FFL Practices for Healthy Ponds and Aquascaping. State and County government members presented: The Regulatory Process, Managing Algae and Sediment, The Dredging Process and Pond Management. The average combined knowledge gain for all eight topics covered was 60%. Seventy-two percent rated their overall satisfaction with the workshop as Excellent.

2. The Tri-County Irrigation Efficiency for Communities Workshop, April 2, 2015, a half day workshop was attended by 38 association board members, property managers and irrigation

contractors. Topics included Quality Landscape with Water Conserving Irrigation, Efficient Irrigation Maintenance and Soil Moisture Sensors in Pasco County. Michael Dukes, UF/IFAS, keynote speaker, discussed Basic Irrigation Practices and Soil Moisture Sensors. Workshop objective was to introduce new water savings technology and provide information on basic irrigation maintenance practices. As a result of the workshop, two Condominium Associations and one Homeowners Association in Pinellas County decided to plan for the installation of Soil Moisture Sensors in their common areas within the next year. Average combined knowledge gain was 64%. Overall satisfaction rate for the workshop was 49% as Excellent.

3. Tri-County region: The University of Florida introduced a new survey instrument during the second quarter of FY 2015. The "FLoWS" survey is based upon Dr. Michael Dukes' research. Tri-County offices used this tool to measure extrapolated water savings data via reported behavior change(s) of the class participants. The behavioral changes (calibrating irrigation systems, installing soil moisture sensor, converting turf to micro-irrigated bed, using a rain shutoff device, reducing irrigation in the summer, using/installing rain barrel(s) were documented by the "FLoWs" survey yielded 63,126,937 gallons saved.

4. Tri-County region: Florida Friendly Landscaping™ benefited by recording "Garden Talk" with Your Neighborhood Inspiration Station AM 1110 WTIS. This educational venue is presented/hosted by FFL Extension Agents and Program Coordinators.

5. Tri-County region Counties: Green Industries – Best Management Practices (GI-BMP) is a science-based educational program for Green Industry workers (lawn-care and landscape maintenance professionals). The GI-BMP program teaches environmentally safe landscaping practices that help conserve and protect Florida's ground and surface waters, saves Florida homeowner's money, time, and effort, increases the beauty of the home landscape, and protects the health of your family, pets, and the environment. The focus of this training is to reduce non-point source pollution resulting from improper fertilization and pesticide application. This program recently won two state awards and one national award for Extension program content and implementation. Agents and Program Coordinator teach the Lawn and Landscape Cultural and Fertilization BMP sections. Teaching results reflected a 94.5% certified pass rate for the 54 attendees.

6. Hillsborough County: Florida-Friendly Landscaping™ 101: Healthy Lawns, Healthy Waters, an annual event, was held on May, 16, 2015. Eighty-seven attendees represented 70 households. Presentations included: State of Water in Florida and Tampa Bay, Healthy Yards-Healthy Waters, Drought Tolerant, Low Maintenance Plants and the Nine Steps to a Florida-Friendly Landscape. Sixty-nine percent of the attendees indicated they would tell three friends about Extension. Eighty-four percent said they would mow their turfgrass at the UF/IFAS recommended height, 82% will use leaves for composting, 79% will mulch to a depth of 3 inches and 76% will not fertilize during the winter.

7. Pinellas County: Flagship bi-monthly program is water-wise landscaping. Topics are rotated so residents can attend multiple presentations, learning more about FFL principles with each workshop.

8. Tri-County involvement with television stations: Hillsborough County works closely with the City of Tampa Television, 'Spotlight Tampa' series which aired eight programs, including

irrigation, recycling, vermicomposting, lawn watering controls and daylight savings time. Pinellas and Pasco County: Fox 13 aired four segments which incorporated the nine FFL principles, rainwater harvesting, water quantity and water quality issues facing the Tri-County which educated nearly six million people.

Recommended Areas of Focus for Next Year

The Tri-County region during FY16 will focus on water conservation and irrigation efficiency in new and existing developments, working more closely with builders and developers before landscapes are designed and installed, identifying and contacting high water users to provide education on alternatives, increase the use of media outlets as programming tools, partner with like-minded organizations to provide educational programs. All programs will continue to participate in the Community Water-Wise Awards and two Tri-County workshops on lawn care and stormwater pond maintenance. The Urban Table will be used for potential ways to quantify water savings of FFL activities to assess potential water savings and standardize result reporting across the region. (Boyer, M.J. and Dukes, M.D. 2013)

The region will continue to work on a model landscape maintenance contract that is expected to change contract specifications. When fully developed by UF/IFAS FFL, it will be made available through Property Management company networks for use by their Boards of Directors wherever the HOA may be located.

All counties will focus on smart irrigation technology education.

Hillsborough and Pinellas Counties will continue to participate in educational opportunities with Adopt-A-Pond and retrofitting in-ground irrigation to microirrigation.

Pinellas County will target new and existing community associations, facility managers and landscape architects.

Pasco and Hillsborough County will focus on the reduction in sod establishment water use and homeowner associations/homeowners due to continued single family home construction occurring there.