

# Memorandum



CITY OF DALLAS

DATE April 15, 2016

TO The Honorable Mayor and Members of the City Council

SUBJECT Proposed Five-Year Water Conservation Work Plan Update

On Wednesday, April 20, 2016, you will be briefed on the Proposed Five-Year Water Conservation Work Plan Update. The briefing materials are attached for your review. The full Draft 2016 Work Plan is available for review at the Water Conservation webpage [www.savedallaswater.com](http://www.savedallaswater.com).

Please feel free to contact me if you have any questions or concerns.

A handwritten signature in black ink, appearing to read 'Mark McDaniel'.

Mark McDaniel  
Assistant City Manager

c: A.C. Gonzalez, City Manager  
Warren M.S. Ernst, City Attorney  
Craig D. Kinton, City Auditor  
Rosa A. Rios, City Secretary  
Daniel F. Solis, Administrative Judge  
Ryan S. Evans, First Assistant City Manager

Eric D. Campbell, Assistant City Manager  
Jill A. Jordan, P.E., Assistant City Manager  
Joey Zapata, Assistant City Manager  
Jeanne Chipperfield, Chief Financial Officer  
Sana Syed, Public Information Officer  
Elsa Cantu, Assistant to the City Manager – Mayor & Council

# City of Dallas Water Utilities

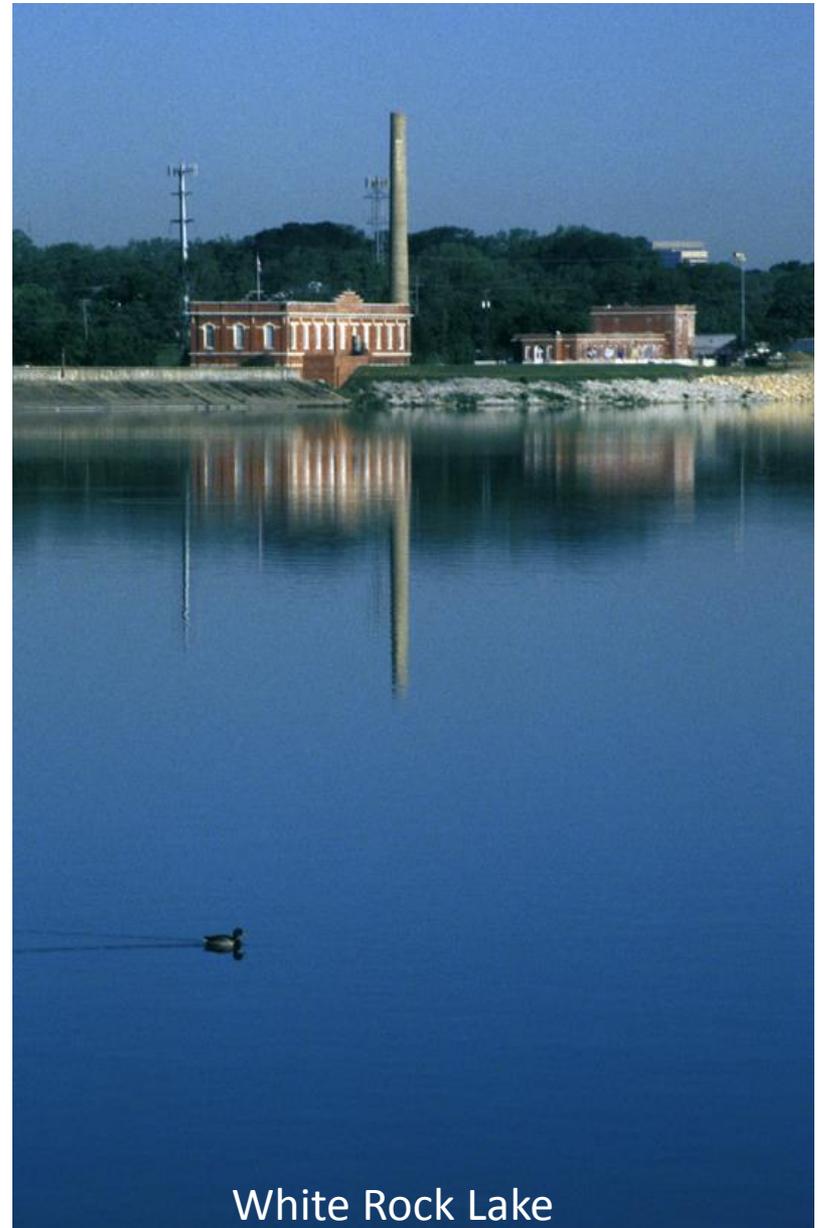
## Proposed Five-Year Water Conservation Work Plan Update

**Dallas City Council**  
**April 20, 2016**



# Outline

- The Need for Water Conservation
- City of Dallas Water Conservation Efforts
- FY2016-2020 Water Conservation Five-Year Work Plan
  - Projected Water Savings and Costs
  - Continued Customer Engagement
  - Water System Improvements
  - Ordinance Changes
- Summary & Timeline
- Appendix



White Rock Lake

# Water Conservation Work Plan Update

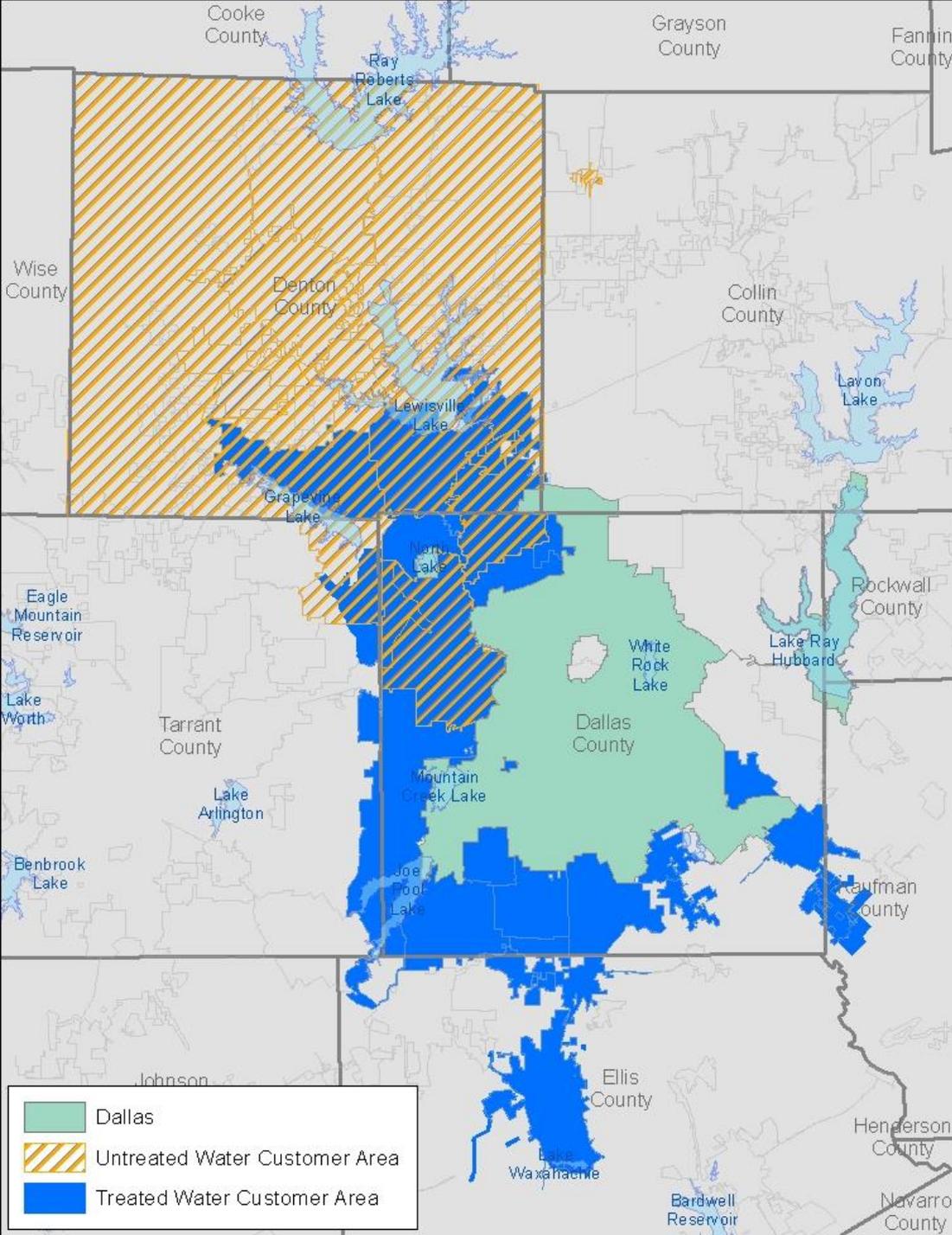
- FY 2015 marked the 10<sup>th</sup> anniversary of Dallas' Water Conservation Strategic Planning efforts
- Over the past decade, we've greatly reduced water demand despite increases in the population and periodic droughts
- Going forward, we will work on increasing water use efficiencies through strategies identified in the 2016 Water Conservation Work Plan
- As the program has expanded and matured, the next five years will focus heavily on water system improvements and targeted programming for top water using premise types

# Work Plan is Foundation for Water Conservation Efforts

- State of Texas requires Water Conservation Plan
  - Mandated by Title 30, Chapter 288, Subchapter A of Texas Administrative Code
  - Updated plans required to be submitted every five years
- Five-Year Work Plan
  - Serves as a road map for compliance with State mandates
  - Serves as a major component of Long Range Water Supply strategies



# **The Need for Water Conservation**



# Dallas Water Utilities

## Service Area

Population served: 2.4 million

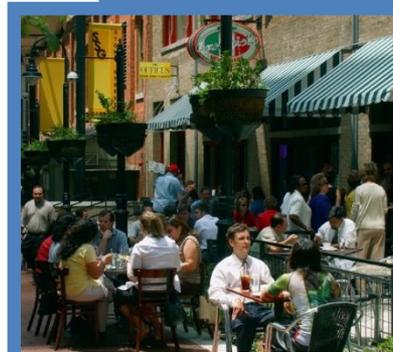
- 1.2 million in Dallas
- 1.2 million in 27 wholesale customer cities

# Conservation as a Demand Management Tool

- Conservation extends the life of our existing resources
- Water savings from long-term behavioral change delays the need for future water sources
- Conservation puts Dallas Water Utilities (DWU) in compliance with the State's conservation requirements prior to requesting future water rights
- While we seek to maximize these efforts, conservation alone will not solve our long-term water needs
- Continued customer engagement and ongoing re-evaluation of the conservation program are necessary to sustain water savings
  - Anything less will erode the gains made, and over time, they will be substantially lost

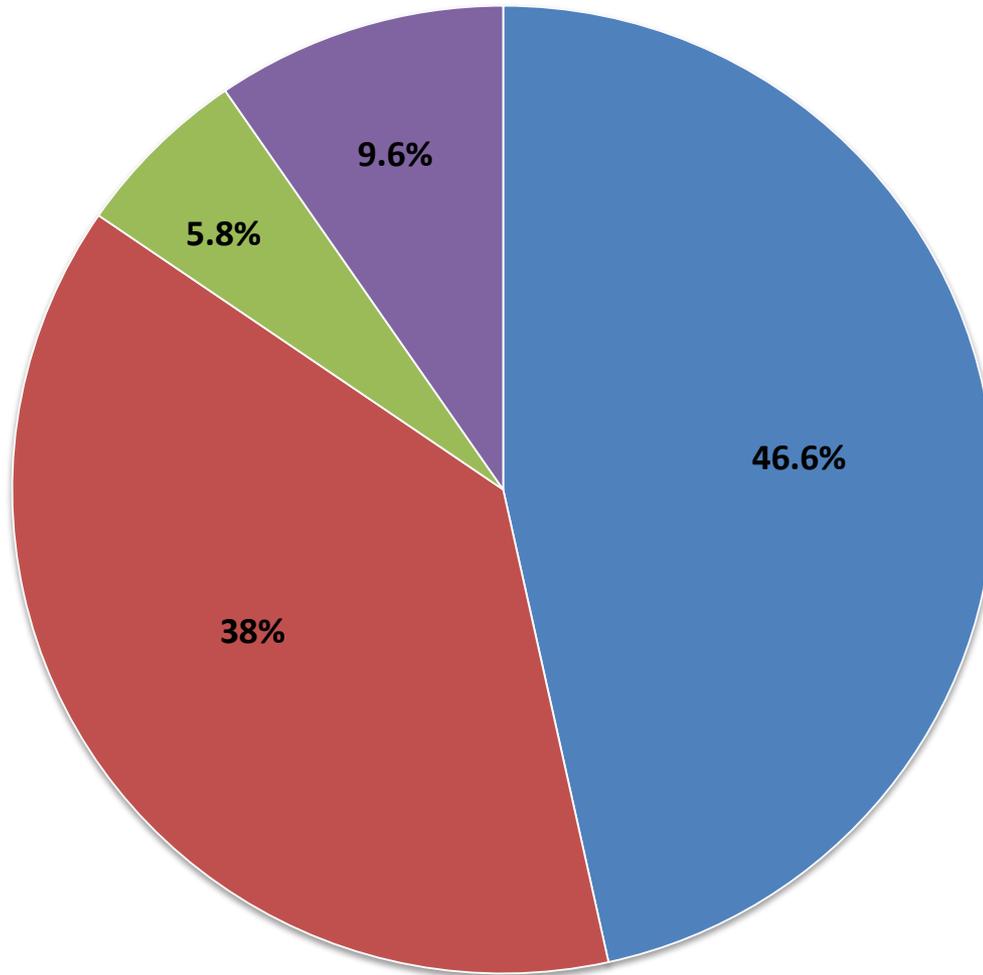
# Drivers of Water Use

- Population growth
- Economic conditions (jobs, new businesses, etc.)
- Household water use
  - Outside watering
  - Inside household use
- System water losses
- Weather patterns



# How DWU's Service Area Water is Used

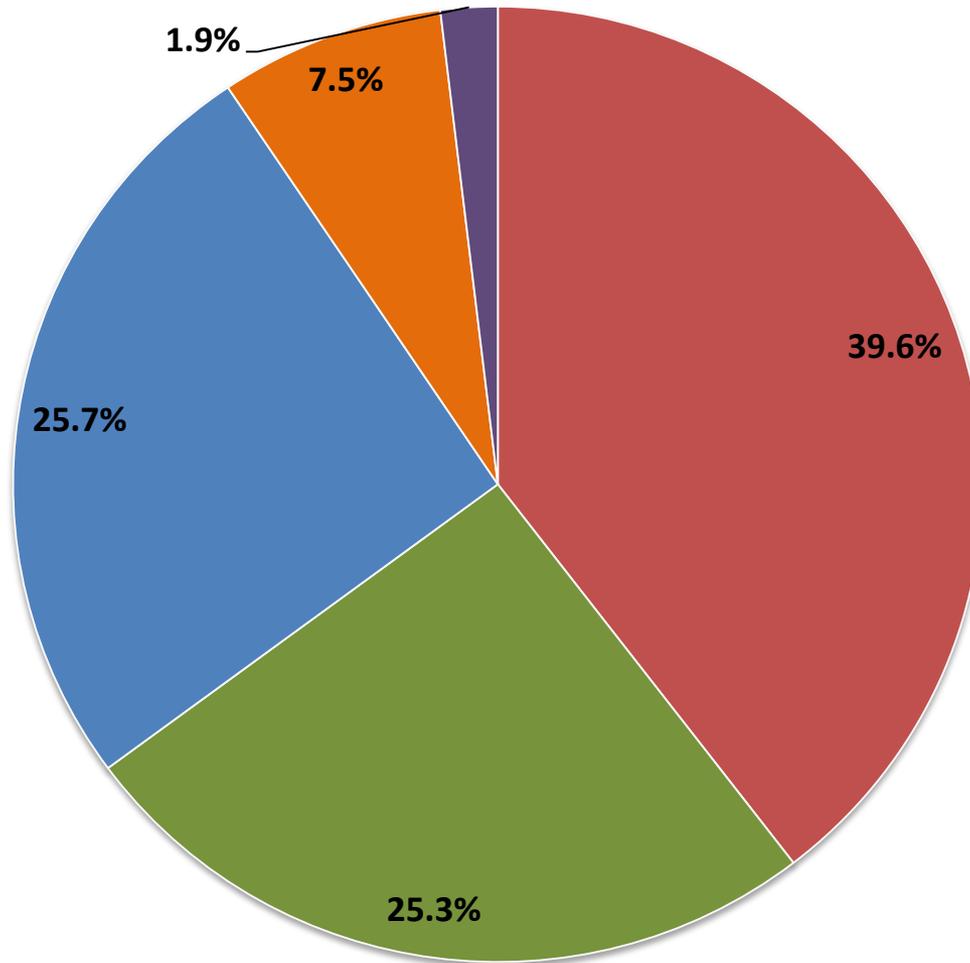
Average Annual Treated Water Production of 143.6BG from FY 2011 – FY 2015



- City of Dallas Retail Sales
- Sales to Customer Cities
- Known Utility System Maintenance & Operation Losses
- Water Losses

# How City of Dallas Retail Treated Water is Used

Annual Average Retail Treated Water Sales of 66.9 BG from FY 2011 – FY 2015



■ Residential (39.6%) ■ Multi-Family (25.3%) ■ Commercial (25.7%) ■ Industrial (7.5%) ■ Municipal (1.9%)

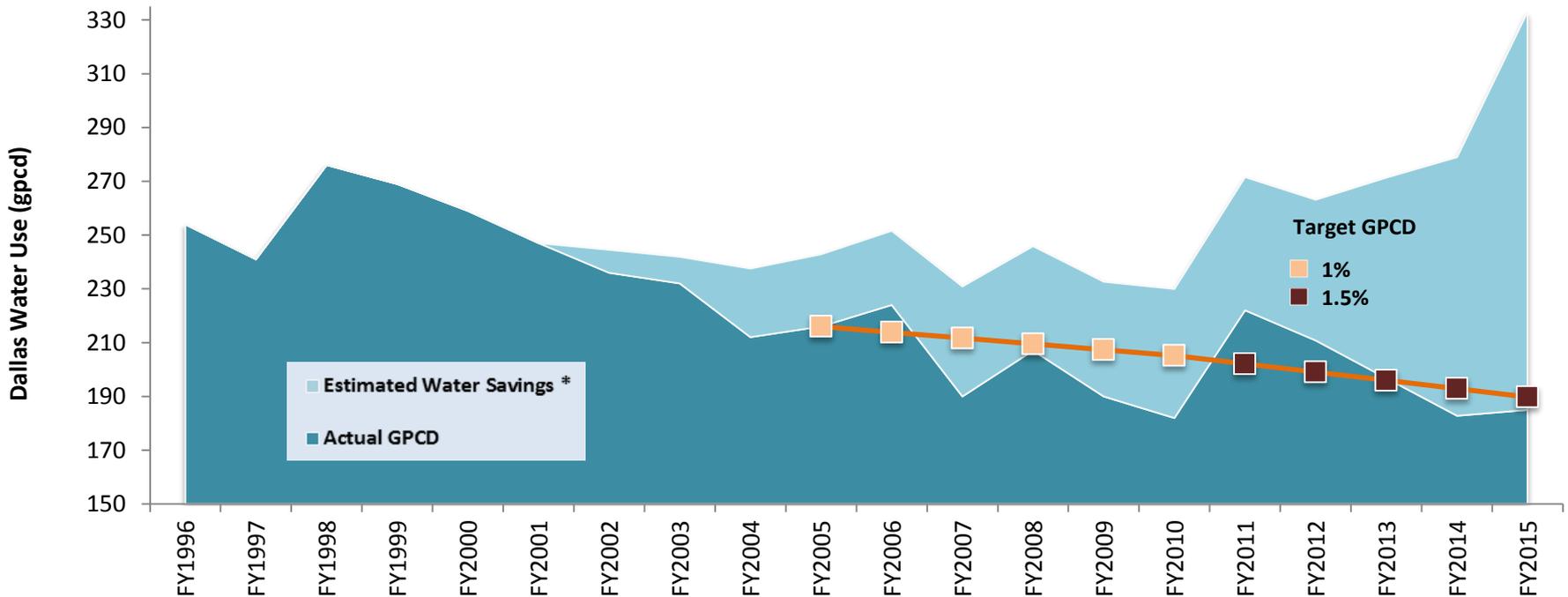
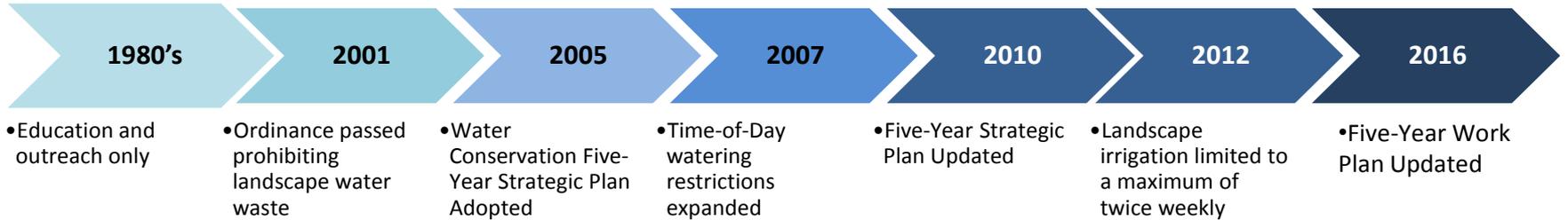


# **City of Dallas Water Conservation Efforts**

# How Success Is Measured

- Total gallons of water saved based on system-wide measures, codes and ordinances and direct programs and services
- Positive changes in public attitudes and behaviors
- Gallons per capita per day (GPCD) trends
  - GPCD as defined by the Texas Water Development Board
    - “the total amount of water diverted and/or pumped for potable use divided by the total permanent population divided by the days of the year”

# Water Conservation Program Chronology and Trends



\* Estimated Water Savings Since FY2001 – 316 Billion Gallons

# Conservation Efforts Are Effective

## What we've spent

- An average of almost \$4.4 million per year over the past fifteen years (\$57.3 Million)

## What we've saved

- Over 316 billion gallons
  - Almost enough to fill Lake Ray Hubbard twice
  - Over two years of water supply
  - Extended life of existing infrastructure

## Perceptions and behaviors are changing

- Since 2001 GPCD Reduced 26%
- Regional public awareness campaign yielding positive results
  - Since 2003, watering ordinance awareness up from 60% to 76%
  - Since 2005, reported behavior changes up from 46% to 71%

**FY 2016-2020 Work Plan will keep the momentum going**





# **FY 2016-2020 Water Conservation Five-Year Work Plan**

# Work Plan Development Process

- Examined existing programs and water use and identified strategic areas to target for additional conservation opportunities
- Strategies that will continue from previous plans include
  - Public Awareness Campaign
  - Toilet Rebate Programs
  - Minor Plumbing Repair Program
  - Environmental Education Initiative
  - Irrigation System Check-Up Program
- New strategies were selected to build on the gains already achieved and to establish new water savings targets for the next five years
- Selected strategies projected to reduce per capita consumption by an average of 1% per year from FY 2016 - FY 2020

# Water Conservation Strategy Evaluation Criteria

- Subjective Criteria
  - Application to a broad range of customers and uses
  - Feedback from stakeholders
  - Applicability and practicability for the City of Dallas
- Objective Criteria
  - Top water using premise types
  - Costs/Benefits
  - Water Savings
- 13 strategies are recommended for implementation or enhancement in FY 2016-2020 Work Plan
  - Budgets to be submitted annually



# Components of 2016 Water Conservation Work Plan

- **Continued Customer Engagement**
  - Public education and outreach
  - Residential and commercial rebates and incentives
  - Mobile apps and customer portals
  - Increased enforcement
- **Water System Improvements**
  - Main replacement program
  - Water loss/leak detection
  - Modernization of meter reading processes
- **Ordinance Changes**
  - Landscape ordinance amendment
  - Best management practices
  - Update to cost of service model to review allocation to customer classes





# **Projected Water Savings and Costs**

# Proposed Measures by User Group

Proposed Measure	User Group				Action		
	SF	MF	ICI	DWU	Ongoing	Enhance	New
<b>Continued Customer Engagement</b>							
1. Residential Irrigation System Rebate Program	✓	✓					★
2. ICI Financial Incentive Program			✓		★	★	
3. Multi-Family Outreach Partnership with Department of Code Compliance		✓					★
4. Wholesale Customer Cities Monitoring, Measurement, and Reporting				✓			★
5. Targeted Outreach to ICI & Large Campus Style Properties	✓	✓	✓				★
6. Enhanced Residential Public Outreach	✓	✓	✓		★	★	
7. Increased Enforcement Efforts	✓	✓	✓	✓	★	★	
<b>Water System Improvements</b>							
8. Water Loss Reduction				✓	★	★	
9. Meter Reading (Apparent Loss Reduction)				✓	★	★	
10. Complete Modernization of Meter Reading Process				✓	★	★	
11. Water Treatment Plant Backwash Optimization				✓	★	★	
<b>Ordinance Changes</b>							
12. Landscape Ordinance Amendment	✓	✓	✓	✓	★	★	
13. Evaluate Alternative Rate Options (DWU Rate Study)		✓					★

SF = Single Family; MF = Multi-Family; ICI = Industrial, Commercial, and Institutional

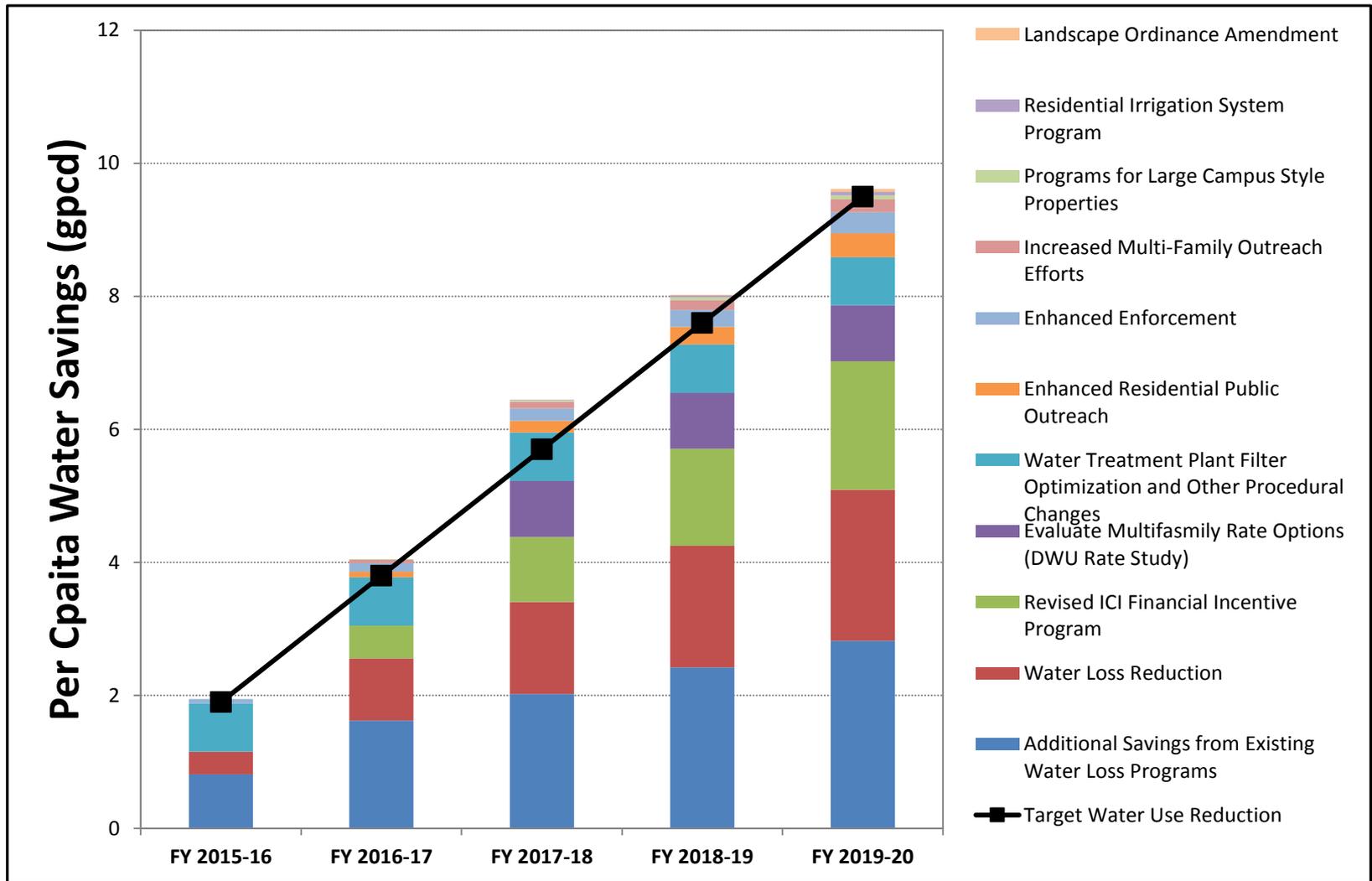
# Water Savings Rankings and Implementation Schedule

Summary of Recommended Implementation Schedule						
Program	Projected Water Savings Rank	FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19	FY 2019-20
Water Loss Reduction	1	1				
Revised ICI Financial Incentive Program	2	2				
Water Treatment Plant Backwash Optimization	3	3				
Evaluate Alternative Rate Options (DWU Rate Study)	4		4			
Enhanced Enforcement	5	5				
Mobile Apps and Customer Portals	6	6				
Wholesale Customer Cities Program	7	7				
Increased Multi-Family Outreach Efforts	8	8				
Programs for ICI and Large Campus Style Properties	9	9				
Residential Irrigation System Rebate Programs	10	10				
Landscape Ordinance Amendment	11	11				
Modernization of Meter Reading Process	12	n/a				
Meter to Billing Loss Reduction	13	n/a				

Savings Rank: lower numbers mean higher water savings

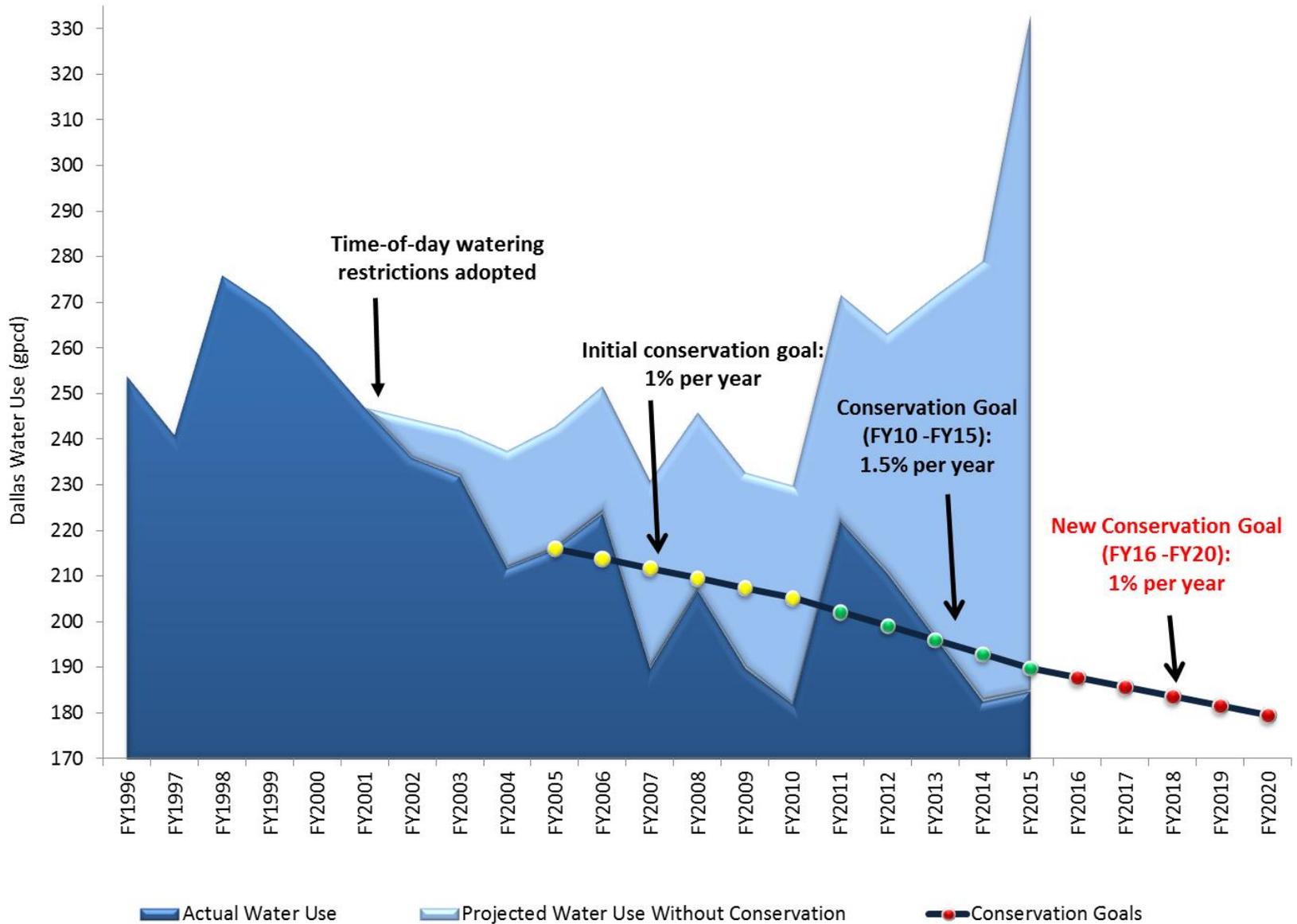
	Strategy Planning and Development
	Implementation
	No Action

# Projected Per Capita Water Savings From Selected Strategies



Projected GPCD reduction of 1% per year yields water savings of approximately 4.3 BG a year by FY20

# New Per Capita Water Consumption Goal FY16-FY20



# Total Projected Costs FY 2016 through FY 2020

<b>Recommended Water Conservation Division Budgets by Fiscal Year</b>					
<b>Anticipated Program Costs in Dollars per Year</b>	<b>FY 2015-16</b>	<b>FY 2016-17</b>	<b>FY 2017-18</b>	<b>FY 2018-19</b>	<b>FY 2019-20</b>
<b>Existing Budget items</b>					
Program Administration	\$1,416,593	\$1,299,651	\$1,243,280	\$1,281,756	\$1,345,119
Minor Plumbing Repair Program	\$400,000	\$400,000	\$419,021	\$419,021	\$419,021
Public Awareness Campaign	\$951,800	\$951,800	\$997,060	\$1,020,491	\$1,020,491
Regional Campaign (TRWD)	\$148,462	\$150,000	\$150,000	\$150,000	\$150,000
Environmental Education Initiative	\$358,713	\$358,713	\$358,713	\$358,713	\$358,713
Toilet Rebate Program	\$1,050,000	\$1,050,000	\$1,050,000	\$1,050,000	\$1,050,000
ICI Audits	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000
ICI Rebate Program	\$0	\$0	\$239,332	\$257,881	\$276,866
ICI Training Program	\$0	\$0	\$25,000	\$25,000	\$25,000
<b>Existing Budget Items Subtotal</b>	<b>\$4,675,568</b>	<b>\$4,560,164</b>	<b>\$4,807,406</b>	<b>\$4,887,862</b>	<b>\$4,970,210</b>
<b>Additional Budget Items</b>					
Landscape Ordinance Amendment	\$0	\$0	\$0	\$0	\$0
Residential Irrigation System Rebate Program	\$0	\$0	\$49,250	\$147,750	\$197,000
Increased Multi-Family Outreach Efforts	\$0	\$0	\$0	\$0	\$0
Programs for High Users and Large Properties	\$0	\$32,474	\$33,237	\$68,037	\$69,636
Enhanced Residential Public Outreach	\$0	\$0	\$132,627	\$135,744	\$138,934
Enhanced Enforcement	\$114,939	\$113,345	\$120,405	\$123,234	\$126,130
<b>Additional Budget Items Subtotal</b>	<b>\$114,939</b>	<b>\$145,819</b>	<b>\$335,519</b>	<b>\$474,765</b>	<b>\$531,700</b>
<b>Total</b>	<b>\$4,790,507</b>	<b>\$4,705,983</b>	<b>\$5,142,925</b>	<b>\$5,362,627</b>	<b>\$5,501,910</b>
<b>Recommended Water Operations Budget by Fiscal Year</b>					
<b>Existing Real Loss Program</b>	<b>\$1,800,000</b>	<b>\$1,842,300</b>	<b>\$1,885,594</b>	<b>\$1,929,906</b>	<b>\$1,975,258</b>
<b>Water Loss Reduction</b>					
Leak Detection and Repair	\$0	\$0	\$289,035	\$688,960	\$760,493
Large Diameter Leak Condition Assessment	\$200,000	\$0	\$50,000	\$50,000	\$50,000
<b>Water Loss Reduction Subtotal</b>	<b>\$200,000</b>	<b>\$0</b>	<b>\$339,035</b>	<b>\$738,960</b>	<b>\$810,493</b>
<b>Total Water Operations Division Budget</b>	<b>\$2,000,000</b>	<b>\$1,842,300</b>	<b>\$2,224,629</b>	<b>\$2,668,866</b>	<b>\$2,785,751</b>
<b>Totals Anticipated Annual Costs</b>	<b>\$6,790,507</b>	<b>\$6,548,283</b>	<b>\$7,367,554</b>	<b>\$8,031,493</b>	<b>\$8,287,661</b>
<b>Cumulative Change in Funding Required from FY 2016</b>		<b>-\$242,224</b>	<b>\$577,047</b>	<b>\$1,240,986</b>	<b>\$1,497,154</b>

# Continued Customer Engagement



- Measures in this category are designed to expand the city's outreach efforts through advanced technologies, financial incentives and technical support

# Customer Engagement

## Wholesale Customer Cities

### Monitoring, Measurement and Reporting

- **Wholesale Customers' Water Conservation Programs**

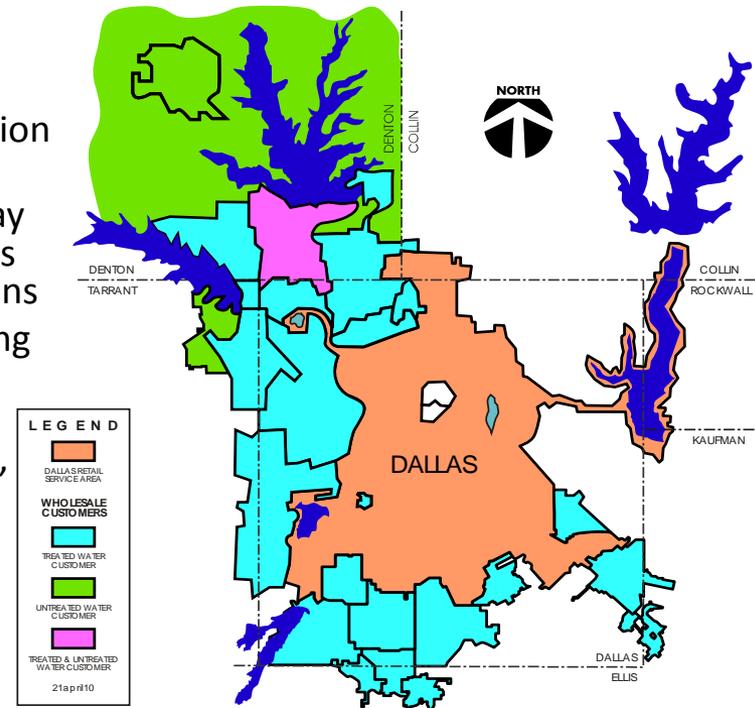
- Maximum twice weekly watering – Of Dallas' 26 customers, three have 2x weekly as part of conservation plans and 17 use 2x weekly in their drought plans
- Time of Day Watering – 13 customers have time of day watering restrictions in their water conservation plans and 8 use time of day restrictions in their drought plans
- Increasing Block Rate - 17 customers have an increasing block rate structure

- **What's next**

- Implement program to monitor wholesale customers' State required water conservation and drought plans
- Consolidate, track and analyze current and historical consumption, GPCD and other pertinent metrics
- Recognize and promote Wholesale Customers' water conservation achievements
- Assist Wholesale Customers in enhancing and expanding their existing programs

- **What we get**

- A method to evaluate and recognize Wholesale Customer Cities' progress and assist them in their water conservation efforts



# Customer Engagement

## *Increased Multi-Family Outreach Efforts*

- **New program for FY 2016-2020**
- **What's next**
  - Partner with Code Compliance to distribute ordinance information during multi-family property managers' outreach events
  - Conduct training on landscape best management practices
  - Perform spatial analysis in an effort to target programming to geographical areas with low customer participation
    - To increase awareness of DWU's toilet replacement programs
    - To increase awareness of ICI audit and rebate programs
- **What we get**
  - Projected average water savings of 44.6 MG/Yr

# Customer Engagement

## *Revised Industrial, Commercial & Institutional (ICI) Financial Incentive Program*

- **What we've accomplished**

- FY 2012- Council authorized funding for ICI rebates
- Up to \$100,000 per project currently available
- 324 audits completed and four customers have applied for rebates since program inception

- **What's next**

- Two options recommended
  - ICI Cost Share Program
    - Rebates offered for up to 50% (parts and labor) of any indoor or process related water conservation project or irrigation system related improvement
    - Maximum rebate \$100,000
    - Offer rebates on domestic fixtures for properties such as hotels and multifamily residential establishments
  - Free Water Saving Fixtures Distribution Program
    - Offer free products to qualifying commercial customers when purchased in bulk through a wholesale city contract
    - Offer free installation of water efficiency fixtures to non profit organizations (faith-based organizations, colleges/universities, government agencies)

- **What we get**

- Increased program participation
- Increased outreach to medium and small businesses
- Turn-key option for non-profit and faith-based organizations



# Customer Engagement

## Programs for ICI & Large Campus Style Properties

### Targeted Outreach



- **New program for FY 2016-2020**
- **What's next**
  - Target ICI and large campus style properties (with one acre or more of irrigable landscape)
    - Program will complement existing rebate and public outreach efforts
  - Partner with Golf Course Superintendents Association of America (GCSAA) and the United States Golf Association (USGA)
  - Promote USGA BMPs, proactively developed through ongoing turf grass and irrigation technology research, to local golf courses
- **What we get**
  - Projected average water savings of 11.7 MG/Yr
  - Increased outreach to large water users
  - Increased customer awareness of their water use and its impacts

# Customer Engagement

## *Residential Irrigation System Rebate Program*

- **New program for FY 2016-2020**
  - Program will complement highly successful irrigation system check-up program and water wise landscape seminars
- **What's next**
  - Offer incentives for
    - Drip irrigation equipment
    - Spray heads with more efficient distribution patterns
    - Weather-based (Smart) controllers
- **What we get**
  - Projected average water savings of 8.2 MG/Yr



# Customer Engagement

## *Increased Enforcement Efforts*

- **What we've accomplished**
  - January 2015- amended Chapters 27 and 49 of the Dallas City Code, providing for civil adjudication of violations of Chapter 49-2 and for civil penalties, fees and court costs
- **What's next**
  - Provided funding in FY 16 budget for Code Compliance personnel overtime pay (2 FTEs)
  - Conduct year-round, periodic neighborhood sweeps from 4:00 am to 8:00 am and from 8:00 pm to midnight (including weekends)
    - Look for automatic irrigation systems running on non-watering days
    - Look for poorly adjusted irrigation systems allowing runoff
- **What we get**
  - Projected average water savings of 85.9 MG/Yr
  - Increased voluntary compliance



# Customer Engagement

## *Enhanced Residential Public Outreach*

### External Customer Web & Mobile Applications

- **What we've accomplished**
  - Conducted pilot program for Water Smart Software
  - Vendor reported
    - 2.6% cumulative water savings
    - 73% of customers said home water reports helped them save water
- **What's next**
  - Use mobile technology to help impact customer behavior regarding water use
  - Use advanced metering external customer service portal to help customers determine how much water they are using
- **What we get**
  - Projected average water savings of 80.1 MG/Y
  - Improved customer awareness and education on water use

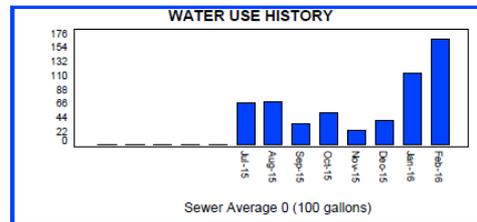


# Customer Engagement

## Enhanced Residential Public Outreach

### DWU Residential Invoice Enhancements

UTILITY								
Service from 1/14/16 to 2/9/16 for 27 days								
Service Provided	Meter Number	Meter Size	Read Previous	Read 2/9/16	Usage in 100 GALS	Usage Charge	Base Charge	Total
Water	123456	5/8 "	768	934	166	74.43	5.12	\$79.55
Sewer					55	28.60	4.58	\$33.18
Sanitation (Residence-Alley/Curb)								\$22.79
Sanitation Tax								\$1.88
<b>Sanitation Charges</b>								<b>\$24.67</b>
Storm Water Charges								\$5.77
<b>Utility Charges</b>								<b>\$143.17</b>



For more information on how to calculate your water bill visit [www.dwucalculator.com](http://www.dwucalculator.com)

Residential Usage Rates* Effective October 1, 2015		
Gallons	Water	Sewer
Tier 1 (0 to 4,000)	\$1.87	\$5.20
Tier 2 (4,001 to 10,000)	\$4.13	\$5.20
Tier 3 (10,001 to 15,000)	\$5.81	\$5.20
Tier 4 Above 15,000	\$8.20	\$5.20
*USAGE charge per 1,000 gallons		
Usage in 100 gallons X 100 = volume for rate calculation		

BASE Charge Effective October 1, 2015		
Meter Size (in inches)	Water	Sewer
5/8	\$5.12	\$4.58
3/4	\$7.07	\$6.27
1	\$10.28	\$9.10
1 1/2	\$19.14	\$17.52
2	\$31.14	\$27.80
3	\$72.93	\$66.72
4	\$121.17	\$106.68

DWU Monthly Invoice was enhanced to help the customer understand how water fees are calculated and how increased usage impacts the total cost. Includes additional information:

- Meter Size- basis for customer charge and required for interactive rate calculator.
- Four Rate Tiers and cost per 1,000 gallons
- Explanation for calculation is provided

# Customer Engagement

## Enhanced Residential Public Outreach

### DWU Residential Rate Calculator

- Online interactive water calculator for residential customers to:
  - Demonstrates how the water bill is calculated by tier
  - Allows customers to validate the water portion of their utility bill
  - Customers can use this tool to estimate the cost impact of higher water use

The screenshot shows the 'Residential Water Charges Calculator' page. It features a navigation menu on the left with options like HOME, MONTHLY PAYMENT RATES, and DWU CALCULATOR. The main content area includes a disclaimer, instructions, and an example. Below the text, there are input fields for 'Usage' (set to 70) and 'Meter Size' (set to 5/8). A large green number displays the estimated monthly charge of \$24.99. At the bottom, an 'Estimation Details' table breaks down the charges into usage and base charges.

**Water Utilities**

### Residential Water Charges Calculator

Estimate water monthly charges based on the amount of gallons you expect to consume for the month and the meter size.

**Disclaimer:** This online calculator is for estimating the residential water charges only, based on a 30-day billing cycle. Sewer, sanitation and storm water charges are not included. Your actual residential water charges may vary depending on any rate changes and the length of the billing cycle. For rate information visit [dwurates.com](http://dwurates.com). For questions or comments, please email us at [waterspecialtyunit@dallascityhall.com](mailto:waterspecialtyunit@dallascityhall.com).

**Instructions:** Provide the information requested below. Your water usage and meter size can be found on your utility invoice. Some accounts have more than one meter. For those accounts with multiple meters, you will need to run the calculator for each meter.

**Example:** If you want to estimate the cost of 5,000 gallons of water, enter 50 in the designated space; if you want to estimate 10,000 gallons, enter 100. The most common residential meter size is 5/8.

70

**\$24.99**

MONTHLY CHARGES ESTIMATE

\*Estimation Details Below

Meter Size 5/8

#### Estimation Details

	USAGE (IN GALLONS)	USAGE CHARGE
Tier 1 (0-4000):	4,000	\$7.48
Tier 2 (4001-10000):	3,000	\$12.39
Tier 3 (10001-15000):	0	\$0.00
Tier 4 (>15000):	0	\$0.00
	7,000	\$19.87
Usage Charge		\$19.87
Base Charge		\$5.12
<b>Total Estimated Water Charges</b>		<b>\$24.99</b>

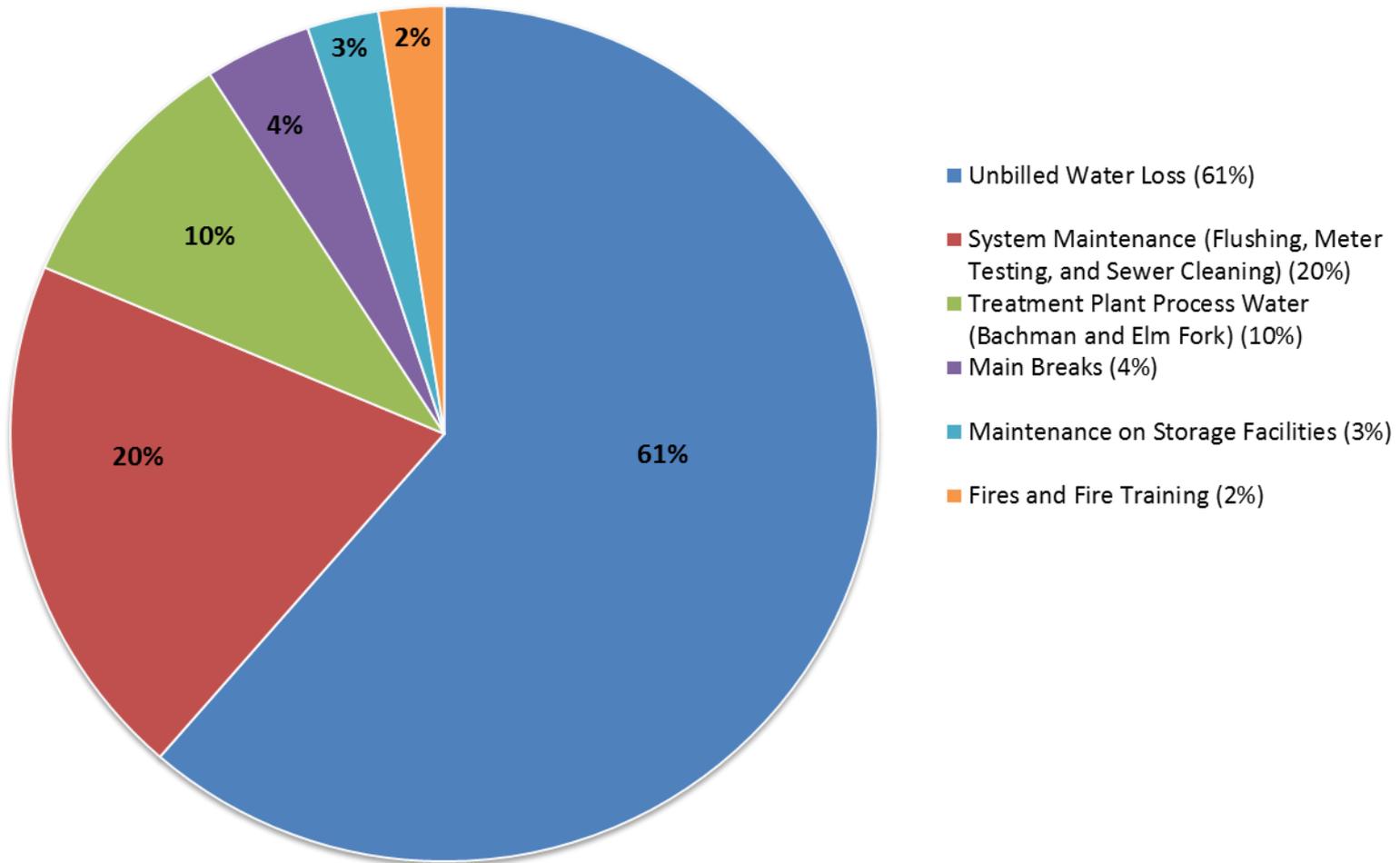
# Water System Improvements



- Measures in this category are designed to impact the annual average of 22.1 BG in unbilled water use that is comprised of:
  - Unbilled Water Loss
  - System Maintenance (Flushing, Meter Testing, and Sewer Cleaning)
  - Treatment Plant Process Water
  - Main Breaks
  - Maintenance on Storage Facilities
  - Fires and Fire Training
  - Unbilled Municipal Uses

# How DWU's Unbilled Treated Water is Categorized

Annual Average Unbilled Water Use of 22.1 BG from FY 2011 – FY 2015



# Water System Improvements

## *Water Loss Reduction*

### *Proactive Leak Detection and Repair*

- **What we've accomplished**
  - Program in place since 2005
  - Entire system surveyed every 2.5 years
  - Crews continue to exceed annual goals
  - An estimated water savings of 3.5 BG since FY 2005
- **What's next**
  - FY16 budget includes \$200k for large diameter leak condition assessment
  - Expand large diameter main leak detection program. Larger diameter leaks tend to release more water over a longer time period without surfacing or failing.
  - Add resources as required to meet large diameter repairs (FY 2018)
- **What we get**
  - Further reduction in water losses
  - Lowered utility costs
  - Minimized property damage
  - Reduced customer disruptions



# Water System Improvements

## *Water Loss Reduction*

*(continued)*

### *Distribution System Main Replacement*



- **What we've accomplished**
  - Maintained 4,925 miles of pipeline in FY 2015
  - Replaced 278 miles of pipeline between FY 2011 and FY 2015 (average of 55.6 miles per year)
  - System age has dropped from 48% (of mains older than 50 years) to 42%
  - Since 2001, main breaks per mile have decreased from 0.6 to 0.3
- **What's next**
  - Maintain current system age
- **What we get**
  - Reduced maintenance costs
  - Reduced water losses
  - Reduced external problems (sinkholes, flooded houses, destroyed streets)

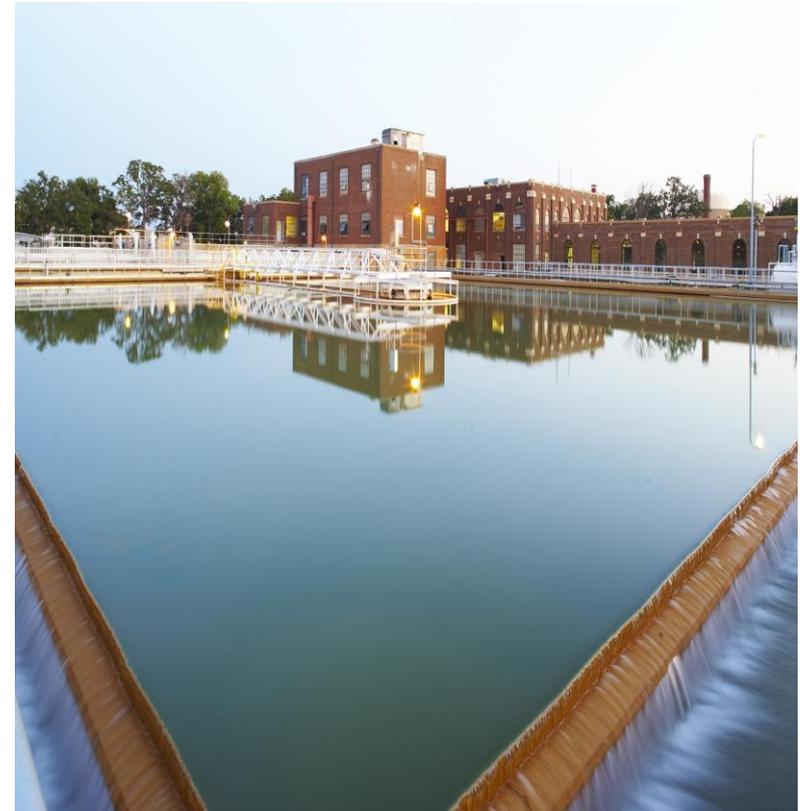
# Water System Improvements

## *Water Loss Reduction*

*(continued)*

### *Filter Cleaning at Water Treatment Plants*

- **What we've accomplished**
  - Bachman Water Treatment Plant (BWTP) treatment capacity is 150 MGD
  - Plant uses a series of filters that must be cleaned (backwashed) every two days
  - New procedures save approximately 328.5 MG/Yr
  - No new costs/ no loss in production/ no loss of water quality- just a change in procedures
- **What's next**
  - Evaluate feasibility of similar procedure changes at East Side and Elm Fork Water Treatment Plants
- **What we get**
  - Reduced operating costs (savings of about \$240,000 per year from BWTP alone)
  - Procedural changes at other water treatment plants have estimated water savings of 1.56 BG/Yr and \$1.14M annually



# Water System Improvements

## *Meter Reading (Apparent Loss Reduction)*

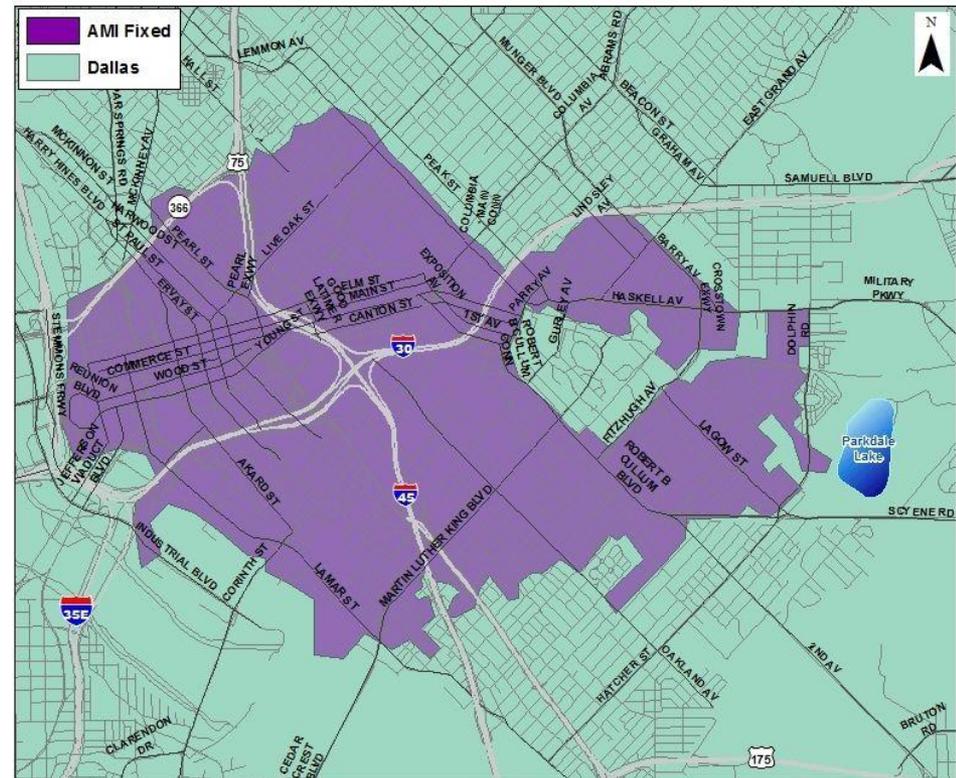
- **What we've accomplished**
  - Developed practice to replace meters when
    - Meter is over 15 years old (varied with size)
    - Replacement of all meters with Advanced Meter Reading (AMR) *ready* meters
  - Replaced 142,660 meters since 2011
  - Testing shows meters to be 99.93% accurate
- **What's next**
  - Perform focused data analytics to determine water consumption anomalies
  - Implement automated process to enhance large meter maintenance program for improved quality assurance
- **What we get**
  - Reduction in unauthorized uses
  - Revenue recovery
  - Enhanced customer service



# Water System Improvements

## *Modernization of Meter Reading Process*

- **What we've accomplished**
  - Two automated network systems installed
    - Advanced Metering Infrastructure (AMI) Fixed Network
    - AMR Mobile Network
  - Modernization process began in 2008
    - AMI-Fixed Network installed in Central Business District, Deep Ellum and Fair Park
      - Approximately 7,000 meters currently read through AMI-Fixed Network
      - Monthly meter reading hours reduced from 302 (manual) to 2 (AMI)



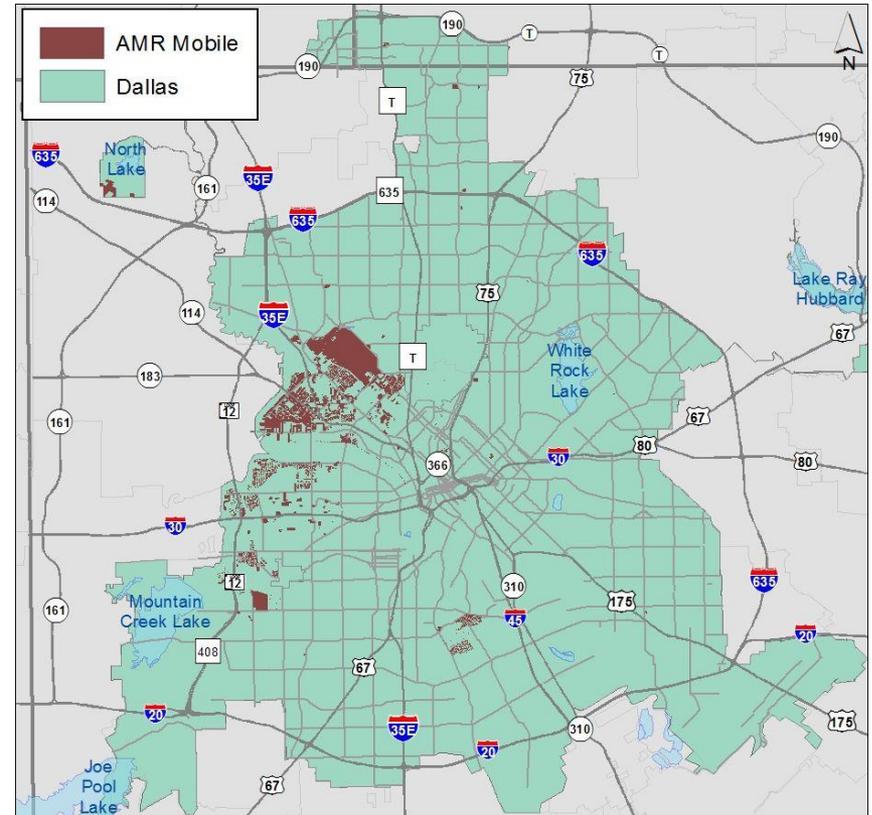
AMI Fixed Network System

# Water System Improvements

## *Modernization of Meter Reading Process*

*(continued)*

- **What we've accomplished**
  - Modernization enhanced in 2014
    - AMR Mobile network used in sections of West Dallas, Cypress Waters and some controlled access properties
    - Approximately 15,700 meters currently read through AMI Mobile technology
    - Monthly meter reading hours reduced from 296 to 96
- **What's next**
  - Continue to procure and install infrastructure
  - Deploy all components within 5 years
    - Field Deployment will be performed in Phases
    - Phase I - Installation of Endpoints on existing AMI Ready Meters
    - Phase I.I - Installation of Communication Grid (Parallel w/Phase I)
    - Phases II and III - installation AMI Meter/Endpoints (route by route)



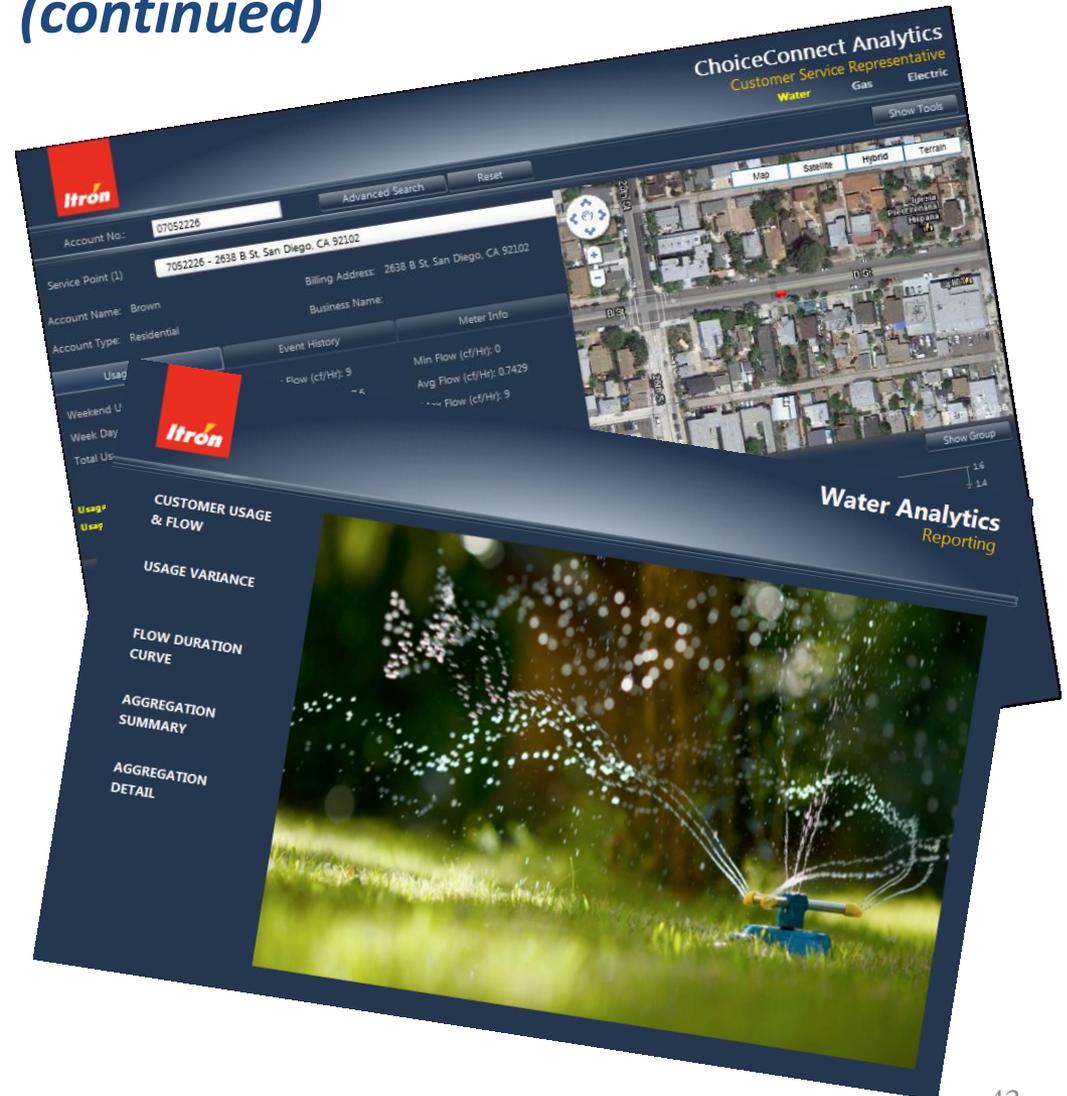
AMR Mobile Network System

# Water System Improvements

## *Modernization of Meter Reading Process*

(continued)

- **What we get**
  - Improved customer service with utility portal
  - Increased operational efficiencies and lower operating costs
  - Enhanced conservation efforts
  - Improved monitoring and enforcement of time-of-day and maximum twice per week watering restrictions



# Ordinance Changes



- Measures in this category are designed to strengthen the city's prohibition of wasteful water use practices and to sustain the advances made in water conservation

# Ordinance Changes

## *Landscape Ordinance Amendments*

- **What we've accomplished**
  - Time of day watering restrictions
  - Mandatory maximum twice weekly watering schedule
  - Green Building Task Force New Construction guidelines
    - Requires drip irrigation for bedding areas
    - Requires minimum number of water efficient fixtures
    - Requires minimum levels of concentration for cooling towers
- **What's next**
  - Article X Revision Recommendations (under review by Zoning and Ordinance Committee)
    - Include water conservation as one of the objectives in the ordinance
    - Include water conservation options as a means of acquiring required “points” for landscape design permit
    - Provide Best Management Practices in the Landscape Manual to be developed as reference guide for the ordinance
- **What we get**
  - Increased awareness of outdoor water conservation programs
  - Reduced outdoor water use
  - Projected average savings of 10.4 MG/Yr

# Retail Cost of Service and Rate Study

## *Evaluation of Commercial Customer Classes*



- **New initiative for FY 2016-2020**
  - Evaluating additional customer classes for commercial customers
- **What's next**
  - Finalize Request for Qualifications to update retail cost of service and rate model
  - Scope includes evaluating:
    - Current cost allocations between customer classes
    - Includes additional tiers for all customer classes
- **What we get**
  - Recommendations by Fall of 2016 for Council consideration



# Summary and Timeline

# Summary

- Five-Year Work Plan serves as a road map to comply with State's water conservation requirements
- Dallas has made great strides in reducing its per capita water demand through the use of conservation and efficiency programs
  - A 26% decrease in per capita usage since FY 2001
  - Ongoing water conservation efforts have saved approximately 316 BG
- Proposed 2016 water conservation goal is to reduce per capita water use by an average 1% percent per year over the next five years by
  - Implementing measures with higher water savings and community interest early
  - Limiting number of programs to be planned/implemented each year
  - Aligning strategies that have similarities/synergies



# Timeline For Plan Adoption

- Post draft plan for public comment
  - April 2016
  - Draft 2016 Work Plan at [www.savedallaswater.com](http://www.savedallaswater.com)
- Five-Year Work Plan finalized
  - May 2016
- Council adopts FY 2016-2020 Water Conservation Five-Year Work Plan subject to annual appropriations
  - May 25, 2016
- Plan will be submitted to TWDB and TCEQ for reference only
  - June 2016



# Appendix

Water Use

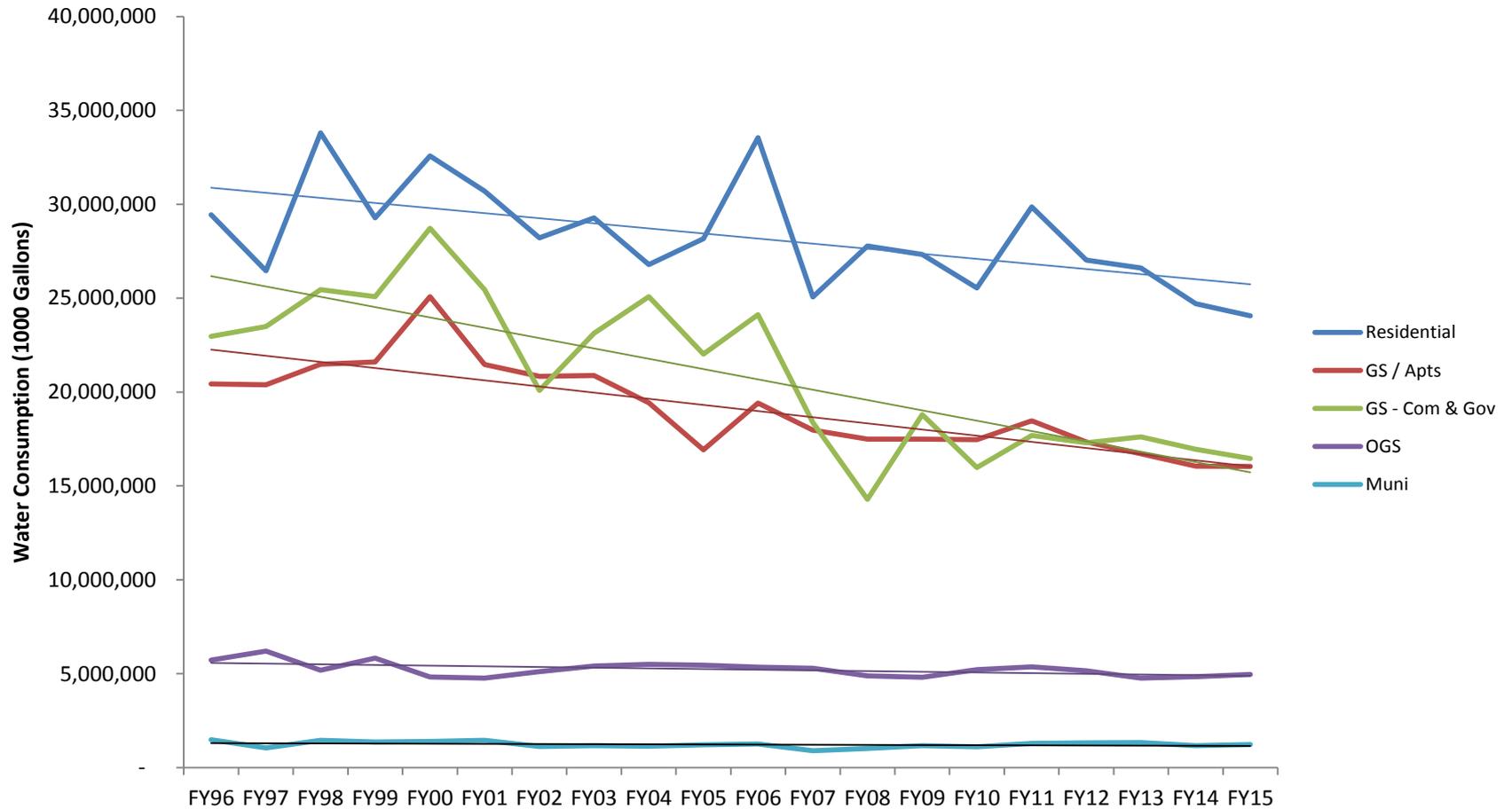
Meter Reading Processes

Water Conservation Program Results

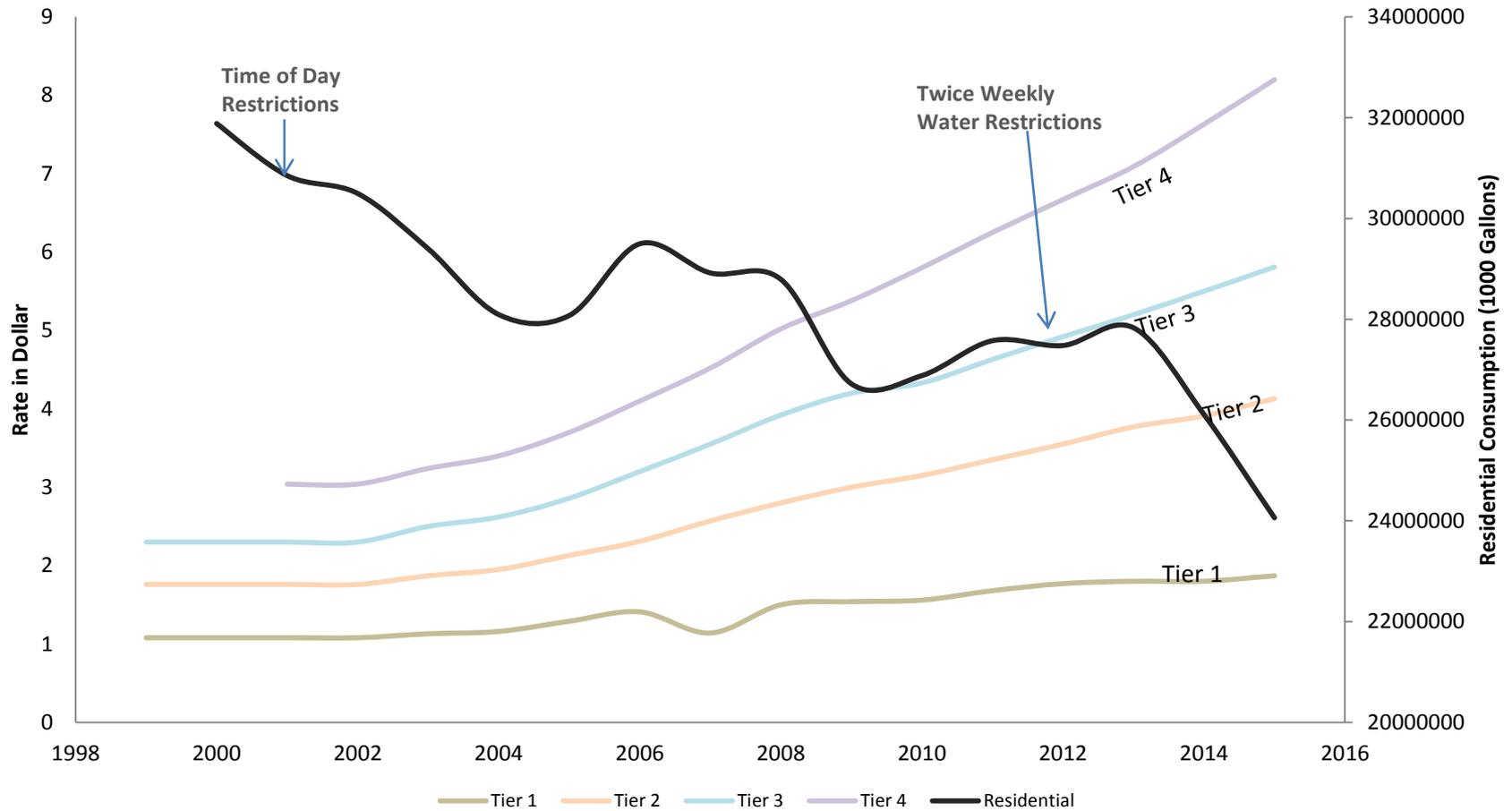


# Water Use

# Water Consumption by User Type



# Residential Tier Structure vs. Consumption

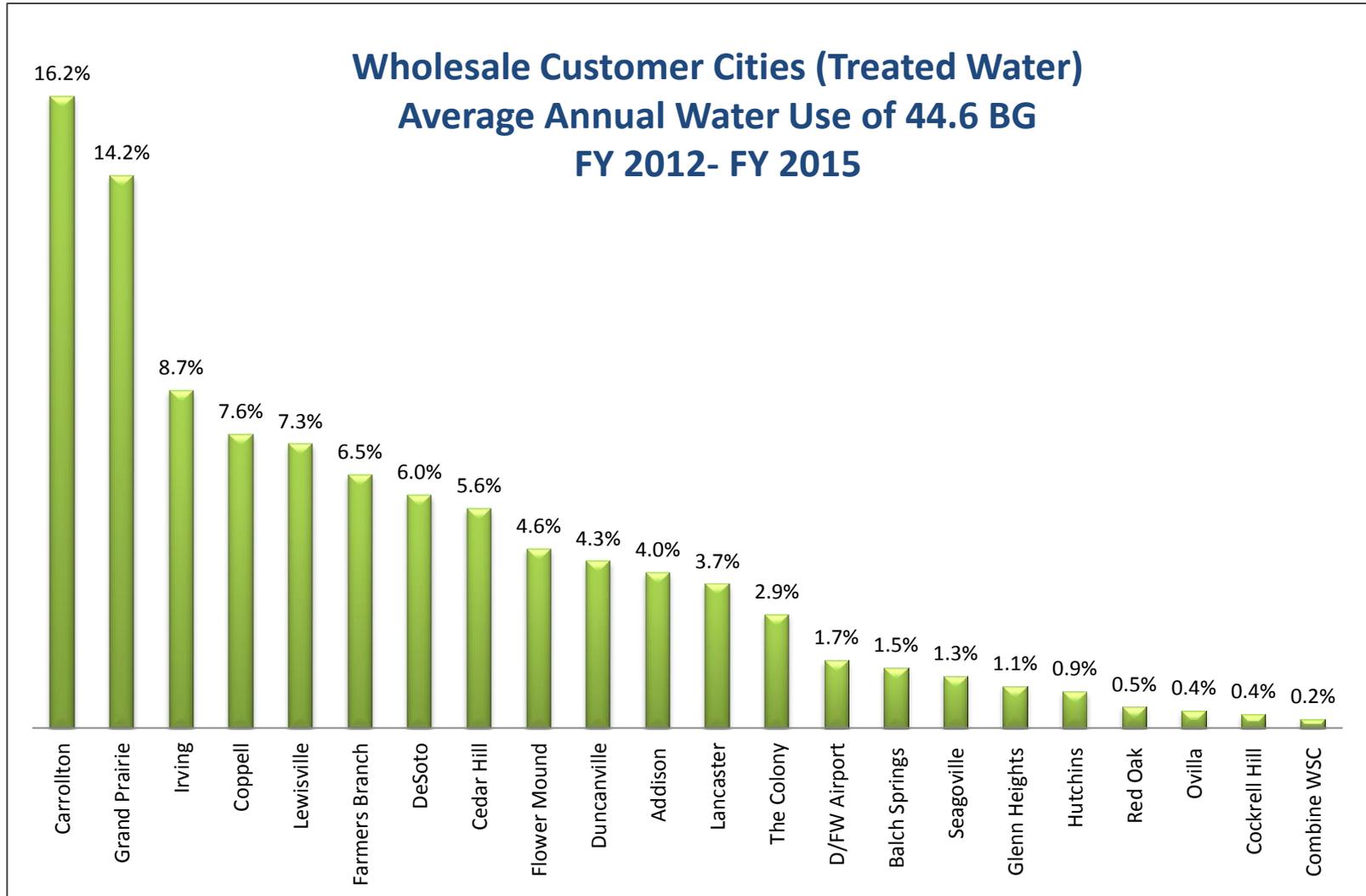


# Per Capita Water Use

Excerpts from Texas Water Development Board Historical Water Use  
Estimates for 2013 by Water User Group

City	2013 Total Per Capita Use	2013 Residential Per Capita Use
Arlington	139	92
Austin	124	74
Dallas	190	75
El Paso	136	87
Fort Worth	140	74
Frisco	176	115
Houston	147	66
Irving	149	91
Plano	190	105
San Antonio	131	78

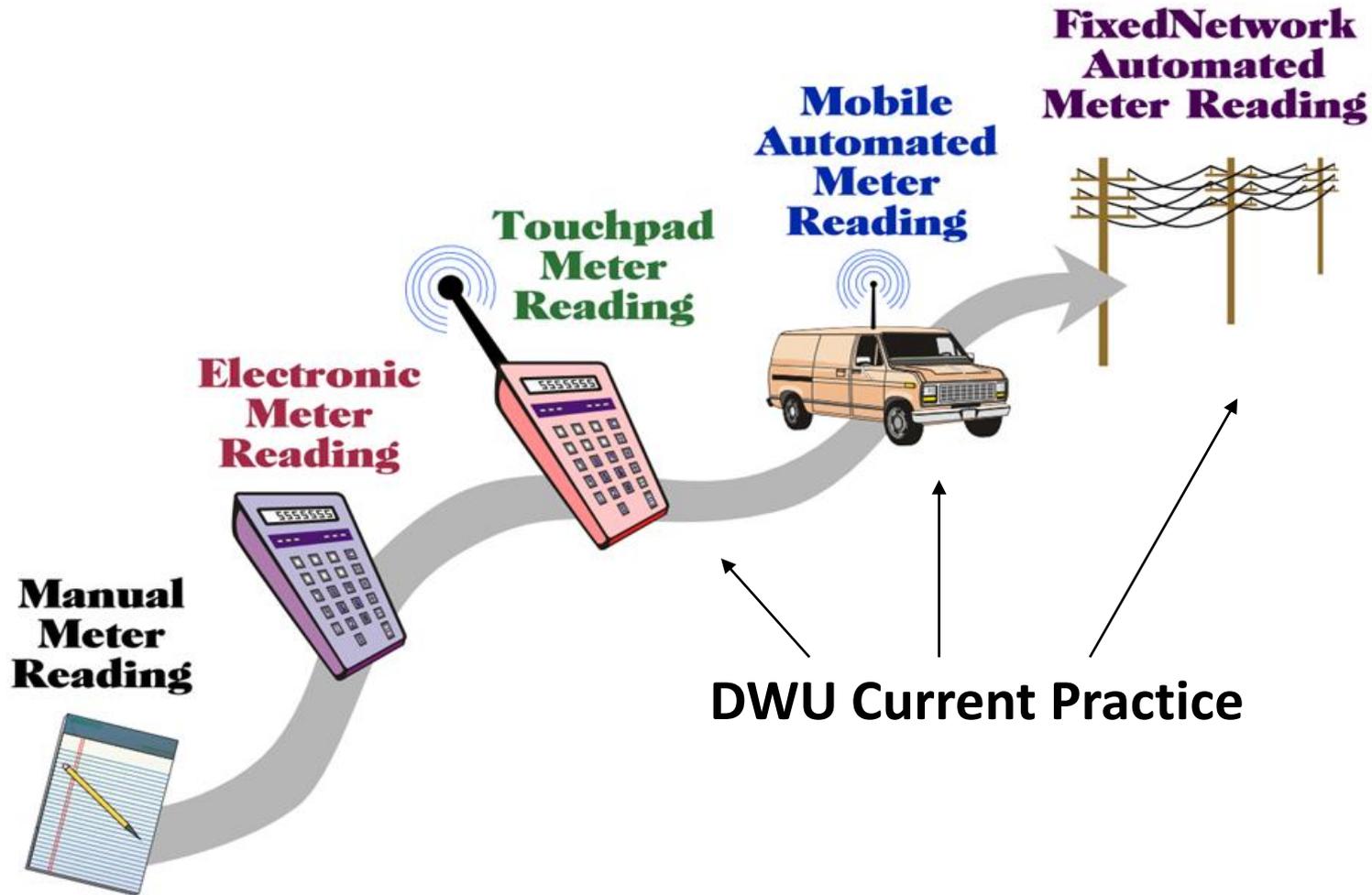
# How DWU's Wholesale Treated Water is Used





# Meter Reading Processes

# Evolution of Meter Reading



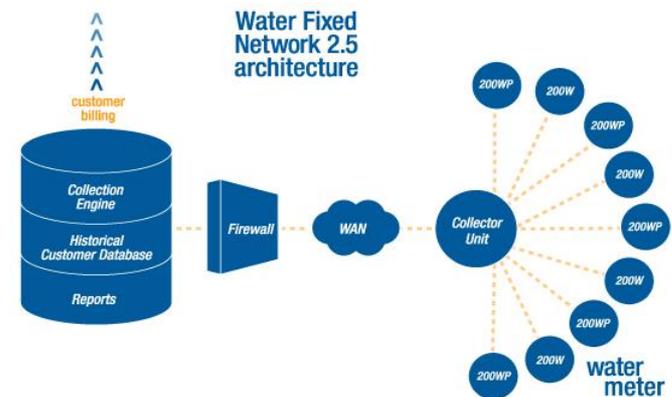
# Automated Options: Mobile System

- Process:
  - Individual meters are retrofitted with a device that will transmit the meter read to a receiver
  - Vehicles are retrofitted with a receiver to collect the meter read data as the vehicle drives within a certain distance from the transmitter
  - A disk with meter reads is manually transferred to the billing system



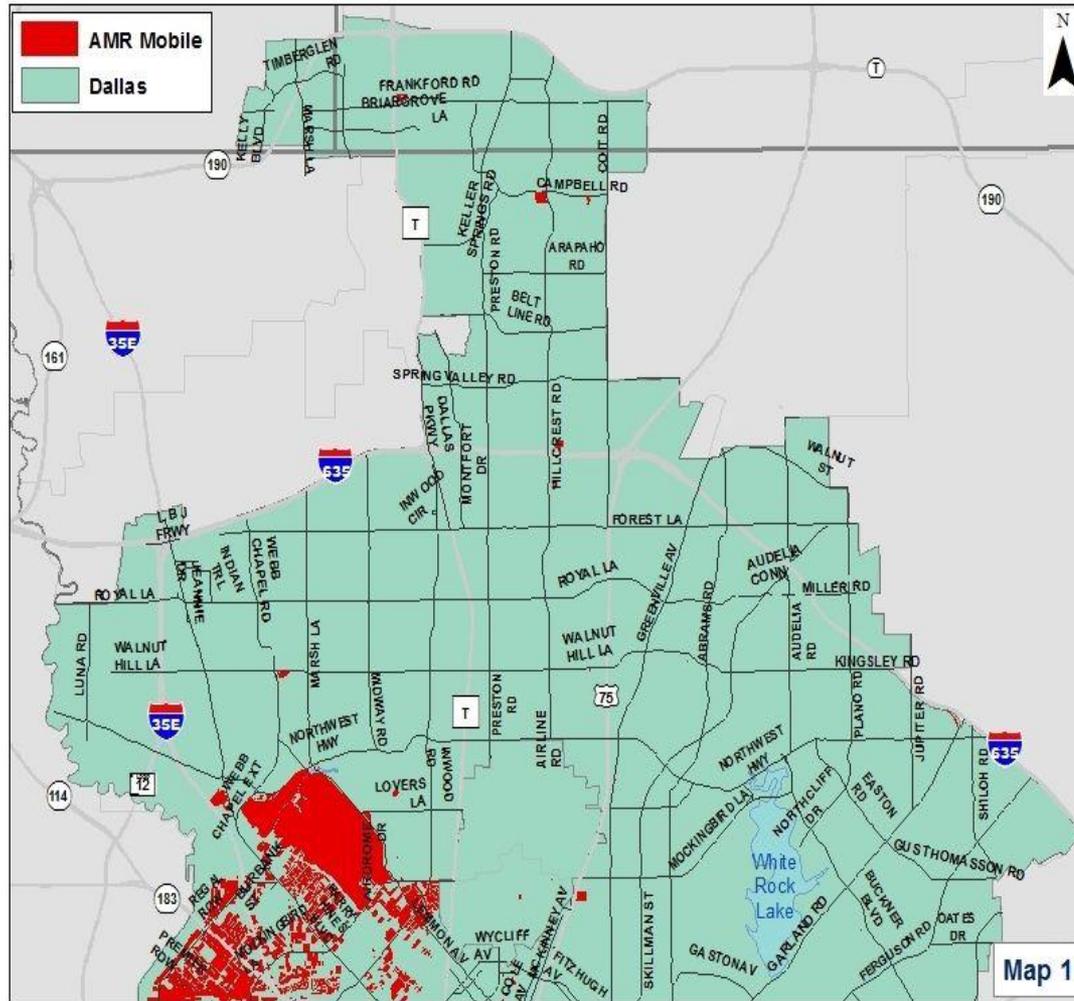
# Automated Options: Fixed Network System

- Process:
  - Individual meters are retrofitted with a device that will transfer meter reads at pre-specified intervals to collection units on top of buildings or other structures
  - Meter read data is then transmitted to host server
  - Server transfers data to the billing system

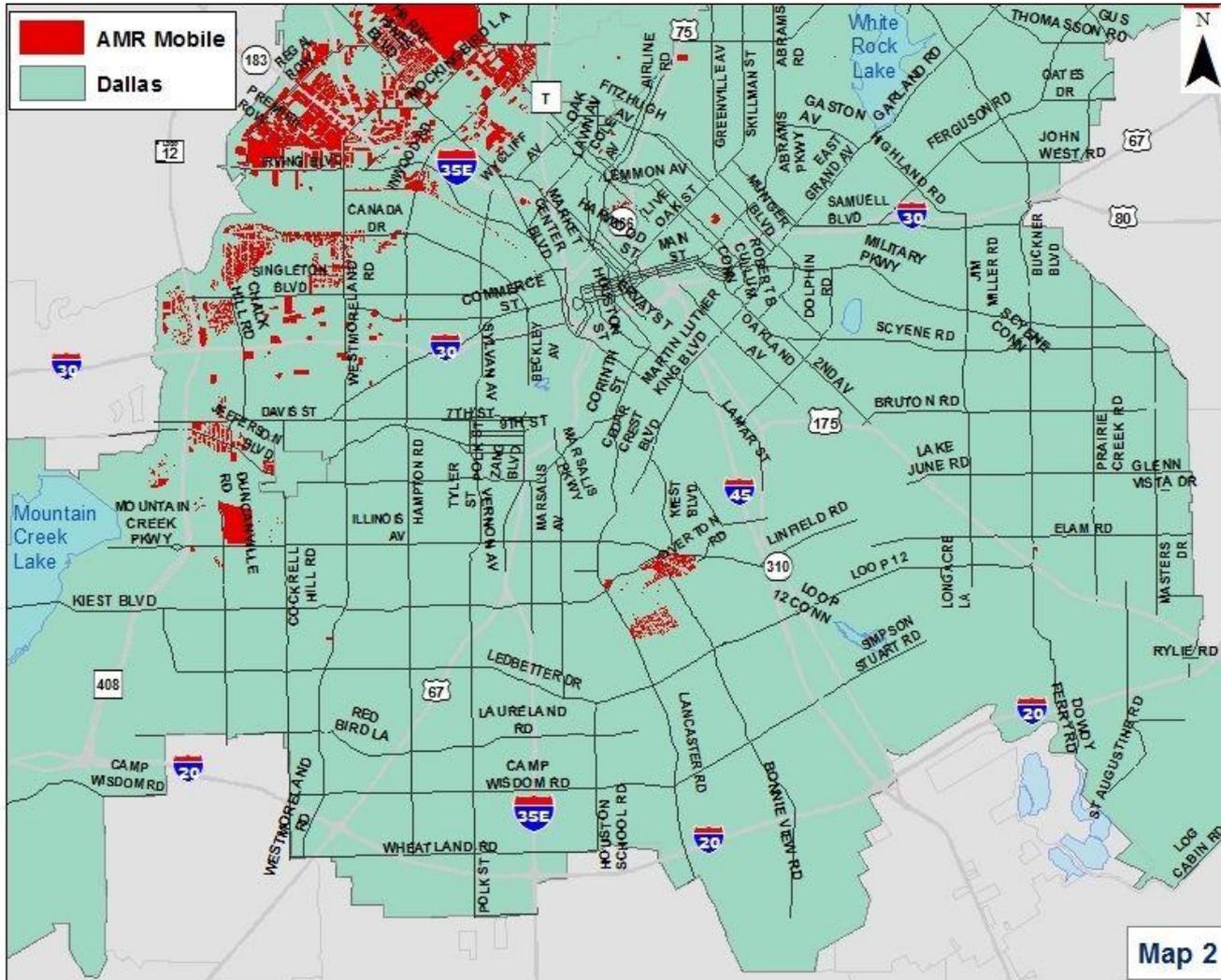




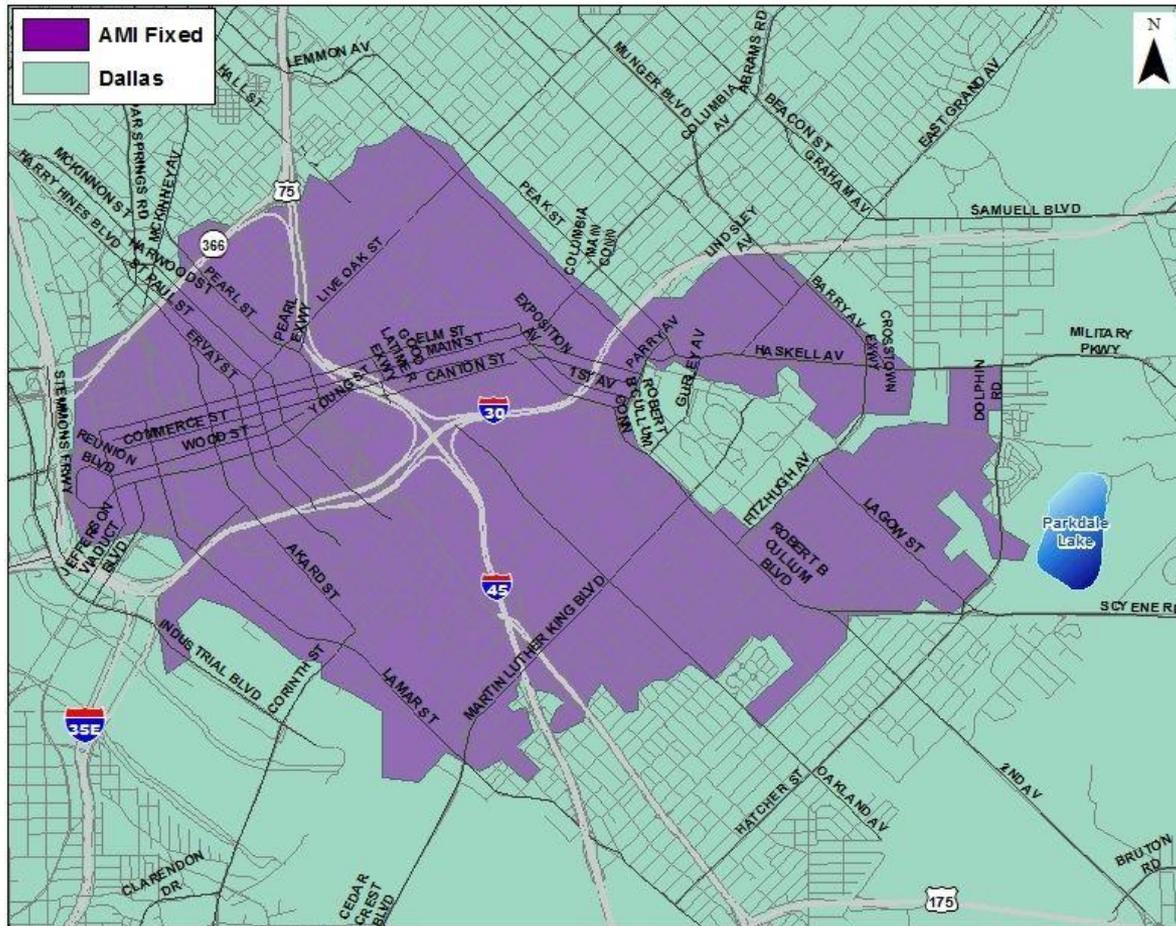
# AMR System- Northern Sector



# AMR System- Southern Sector



# AMI Fixed Network System



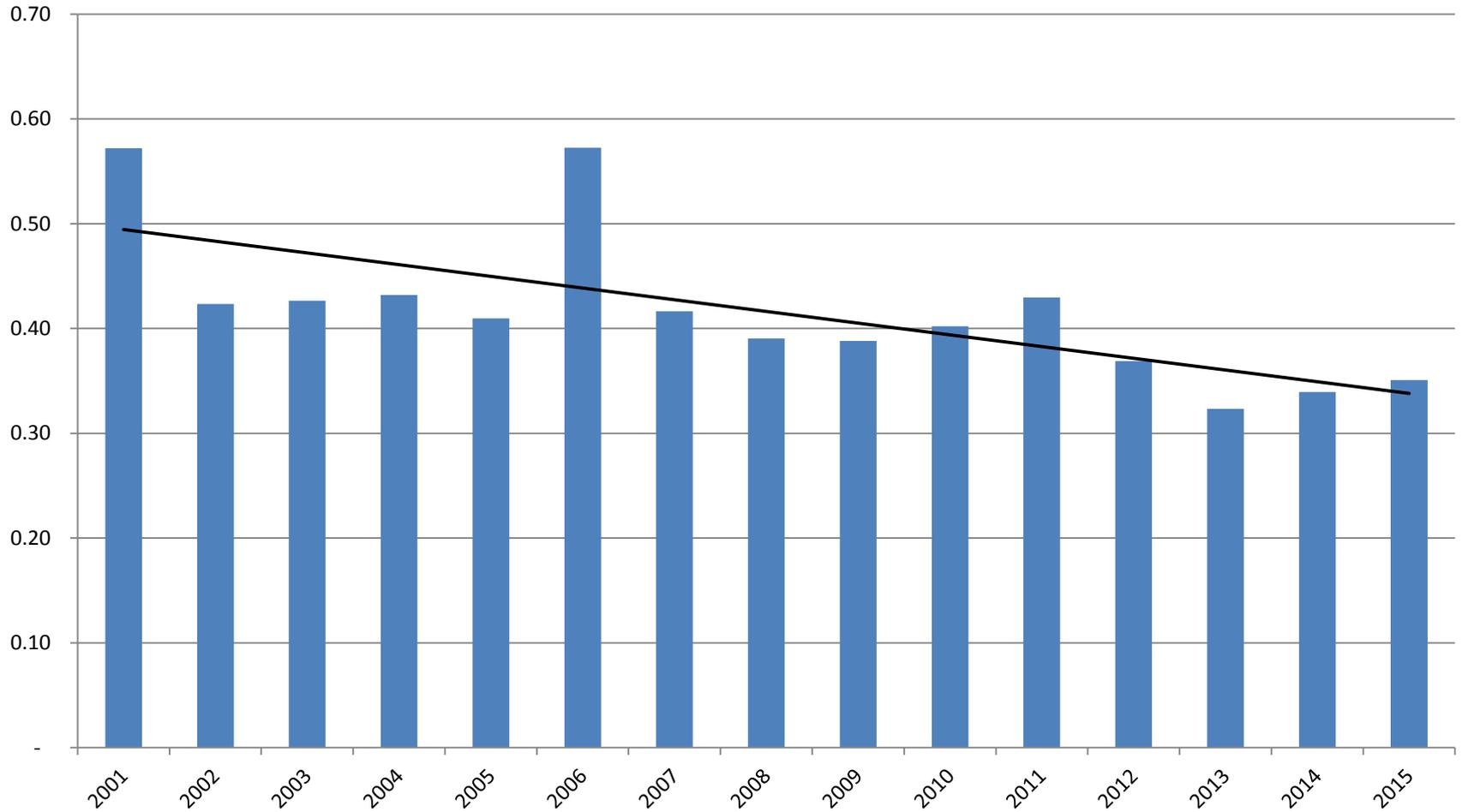


# **Water Conservation Program Results**

# Listing of Previously Recommended Strategies

Strategy	Adopted Plan	Implemented			Year Implemented	Continue Strategy?	Comments
		Fully	Partially	Not			
Water Wise Landscape Events		✓			FY 1994	Yes	
DWU Water and Wastewater Ordinance Amendments		✓			FY 2001	Yes	Amended in FY 2001, FY 2006, FY 2012
Tiered Rate Structure		✓			FY 2001	Yes	
Public Awareness Campaign		✓			FY 2002	Yes	
Rain and Freeze Sensor Rebate Program		✓			FY 2003	No	Program discontinued in FY 2004
Leak Detection & Repair and Control of Water Loss		✓			FY 2005	Yes	Enhanced in FY 2007, FY 2009, and FY 2011
Environmental Education Initiative (K-12)	2005	✓			FY 2006	Yes	
Irrigation System Inspections	2005	✓			FY 2006	Yes	
Minor Plumbing Repair Program	2005	✓			FY 2006	Yes	
Water Conservation Mascot	2005	✓			FY 2007	Yes	
Cooling Tower Audits		✓			FY 2007	No	Program expanded in FY 2012 to ICI Surveys
Water Conservation Grant Program for City Facilities	2005	✓			FY 2007	Yes	
Industrial/Commercial/Institutional (CI) Pre-rinse Spray Nozzle Program	2005	✓			FY 2007	No	Program no longer offered. Market saturated
Toilet Voucher/Rebate Programs	2005	✓			FY 2007	Yes	Projected to reach saturation in FY 2023
Hospitality Industry Program	2010	✓			FY 2011	Yes	
ICI Water Efficiency Surveys	2010	✓			FY 2012	Yes	
ICI Rebate Program	2010		✓		FY 2012	Yes	Scheduled for further review in FY 2016
ICI Commercial Equipment Ordinance Amendment	2010		✓		FY 2014	Yes	Phase I of Green Building Code Adopted
Accurate Supply Source Metering		✓			Pre FY 2000	Yes	
Universal Metering, Meter Testing Repair & Replacement		✓			Pre FY 2000	Yes	
Showerhead, Aerator Kits Handouts		✓			Pre FY 2000	Yes	
ICI Business Partnership Program	2010			✓	FY 2016	Yes	
ICI Training Programs	2010			✓			Scheduled for FY 2017
Water-wise Landscape Design Requirements	2010			✓			Currently under review
Residential Irrigation System Incentive Program	2010			✓			Recommended in 2016 Work Plan
Residential Clothes Washer Incentive Program	2010			✓			Program not implemented
Increased Enforcement Efforts	2005		✓		FY 2016		Pilot Program Implemented in FY 2015

# Main Breaks per Mile



# Pipeline Replacement Prioritization

## Based on Repair History

- Break Index Calculation

$$= \frac{\text{Number of repairs}}{\left( \frac{\text{length of pipe segment}}{1,000} \right)} \times \left( \text{Years since first recorded repair} \right)$$

- Prioritization

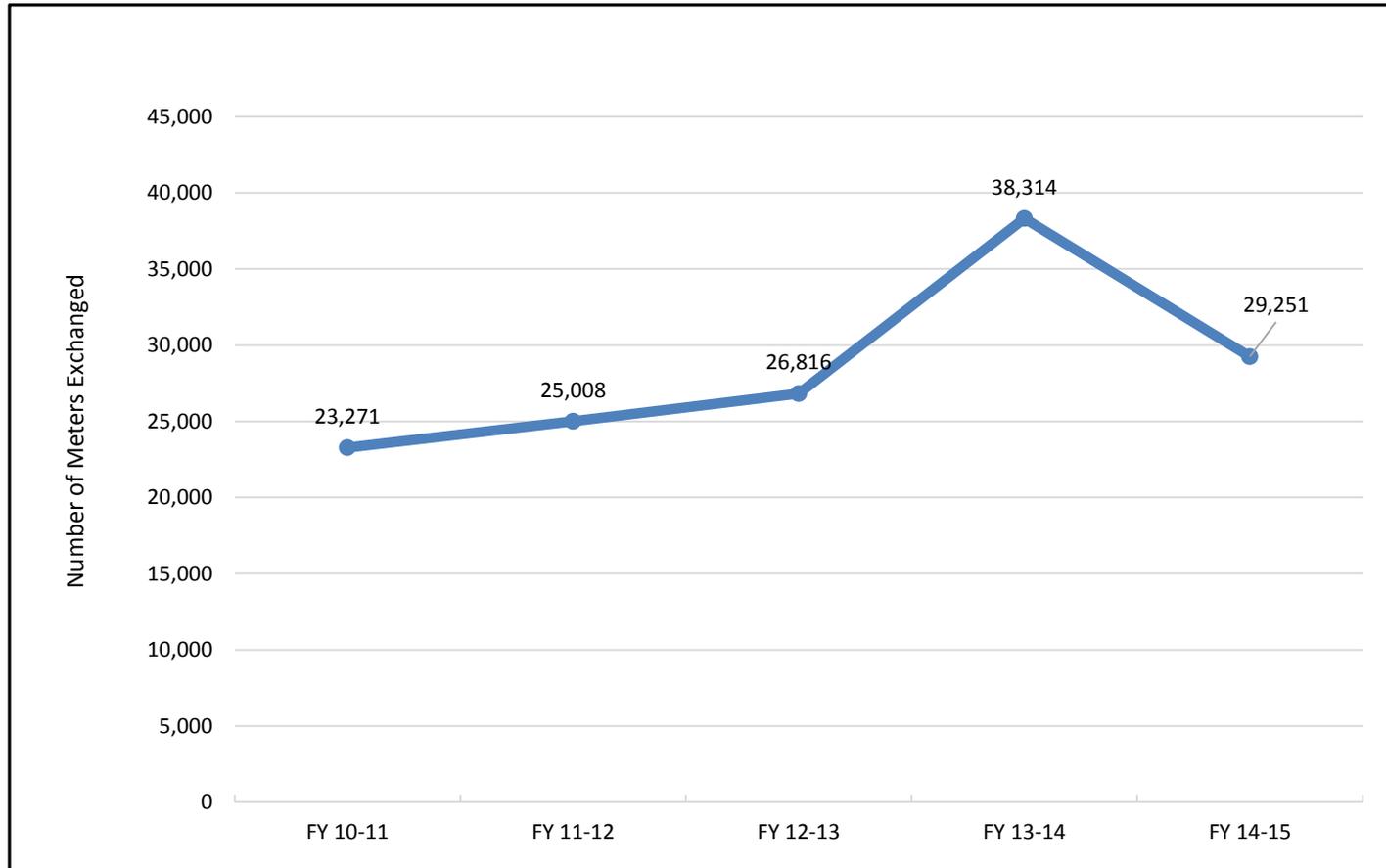
Priority*	Break Index
1	2.0+
2	2 to 1.5
3	1.5 to 1.0
4	1.0 to 0.75
5	0.75 to 0.4

\*Priority 1 = Most urgent need of replacement

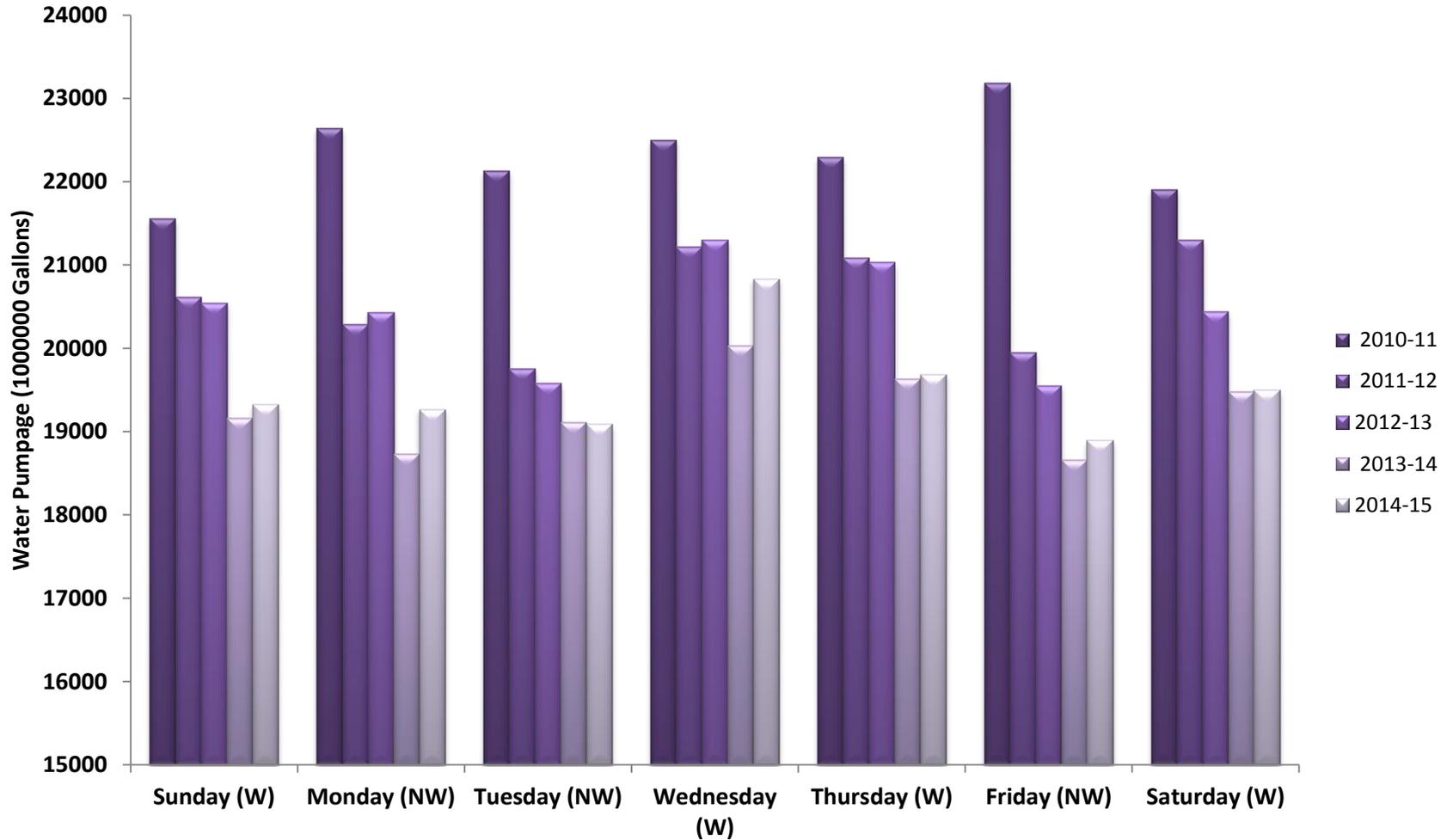
- Other Factors Considered in Prioritization

- Water quality issues
- Potential property damage
- Impact to customer service
- Other projects in the area
- Soil corrosivity
- Type of thoroughfare
- System improvement (capacity)
- Size, age and type of pipe
- Impact to other utilities
- Difficulty of access for maintenance

# Meter Exchange Rate within DWU

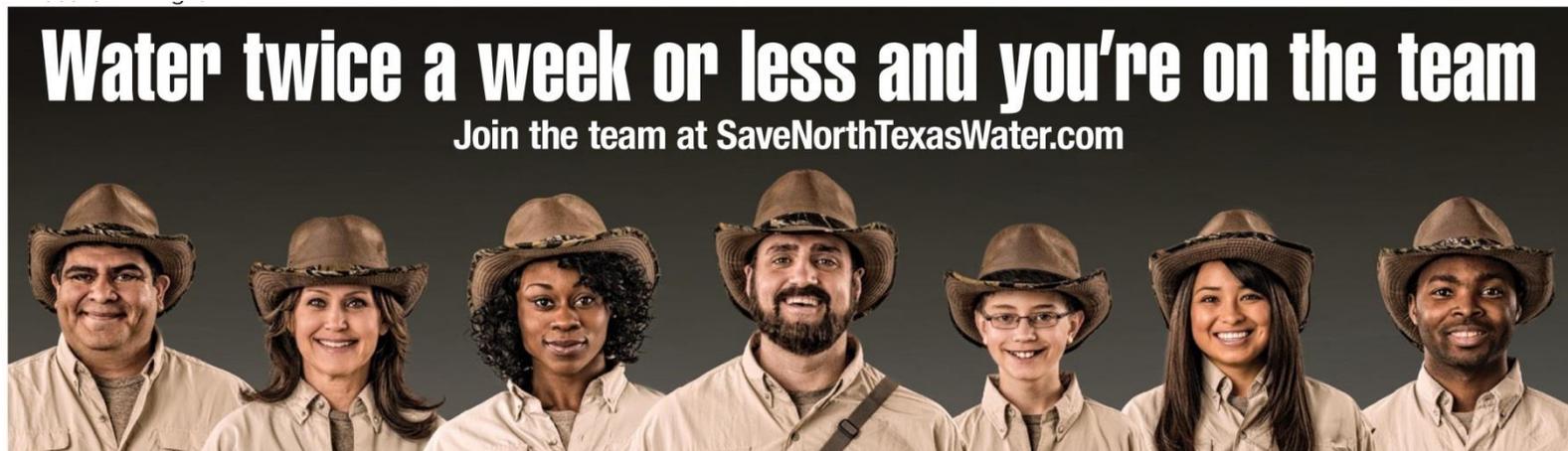


# Water Consumption (MG) on Watering v. Non-Watering Days FY 2011 through FY 2015



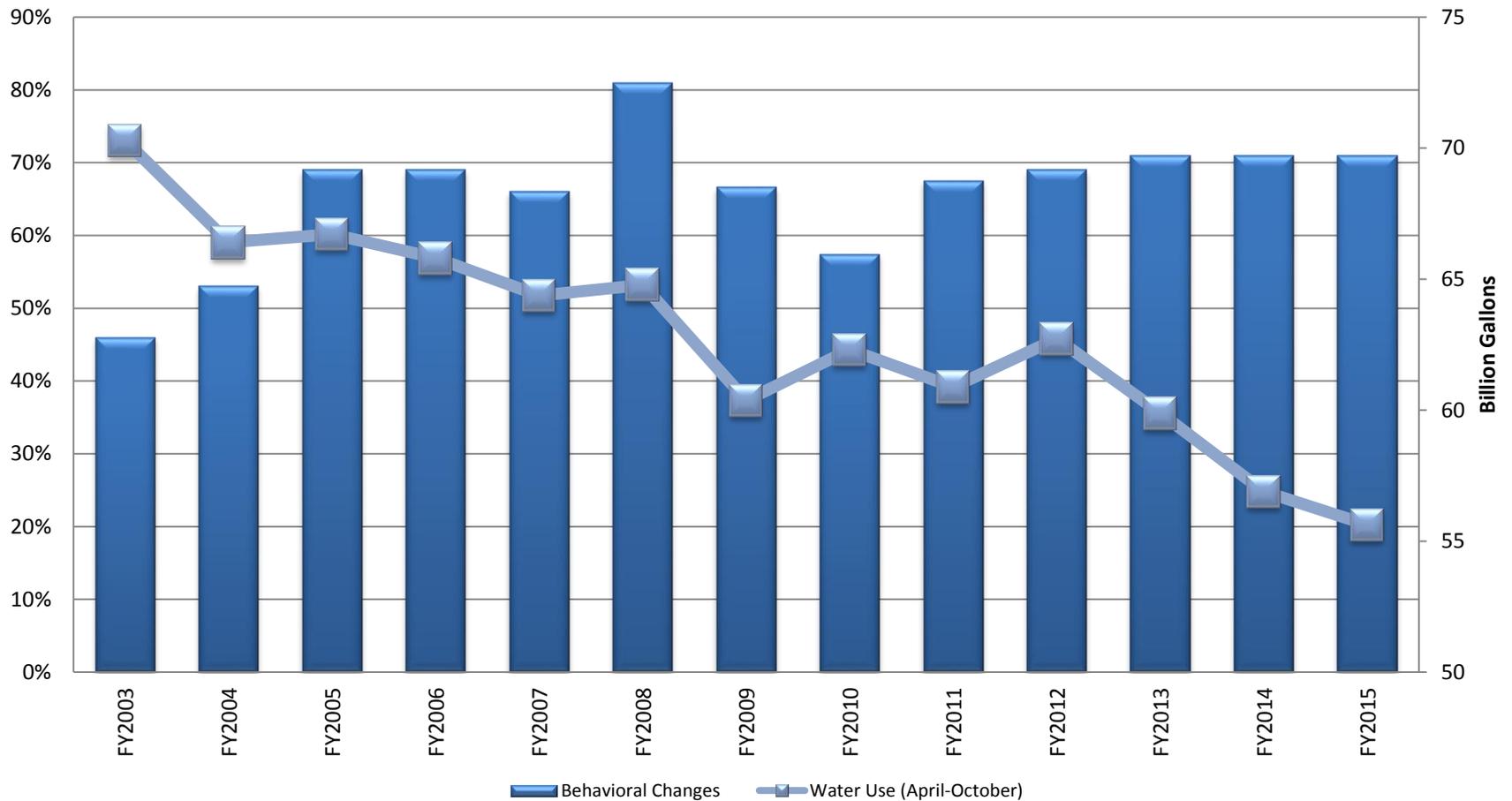
# Public Awareness Campaign Results

- The City's public awareness campaign, "Save Water. Nothing Can Replace It", promotes water conservation with television ads, radio ads, billboards, print ads, internet and social media
- Creative partnership with Tarrant Regional Water District since 2009 has resulted in:
  - Dallas and Tarrant Counties share a message with one voice to conserve
  - Double the message coverage
  - Costs for creative development are shared by the two agencies



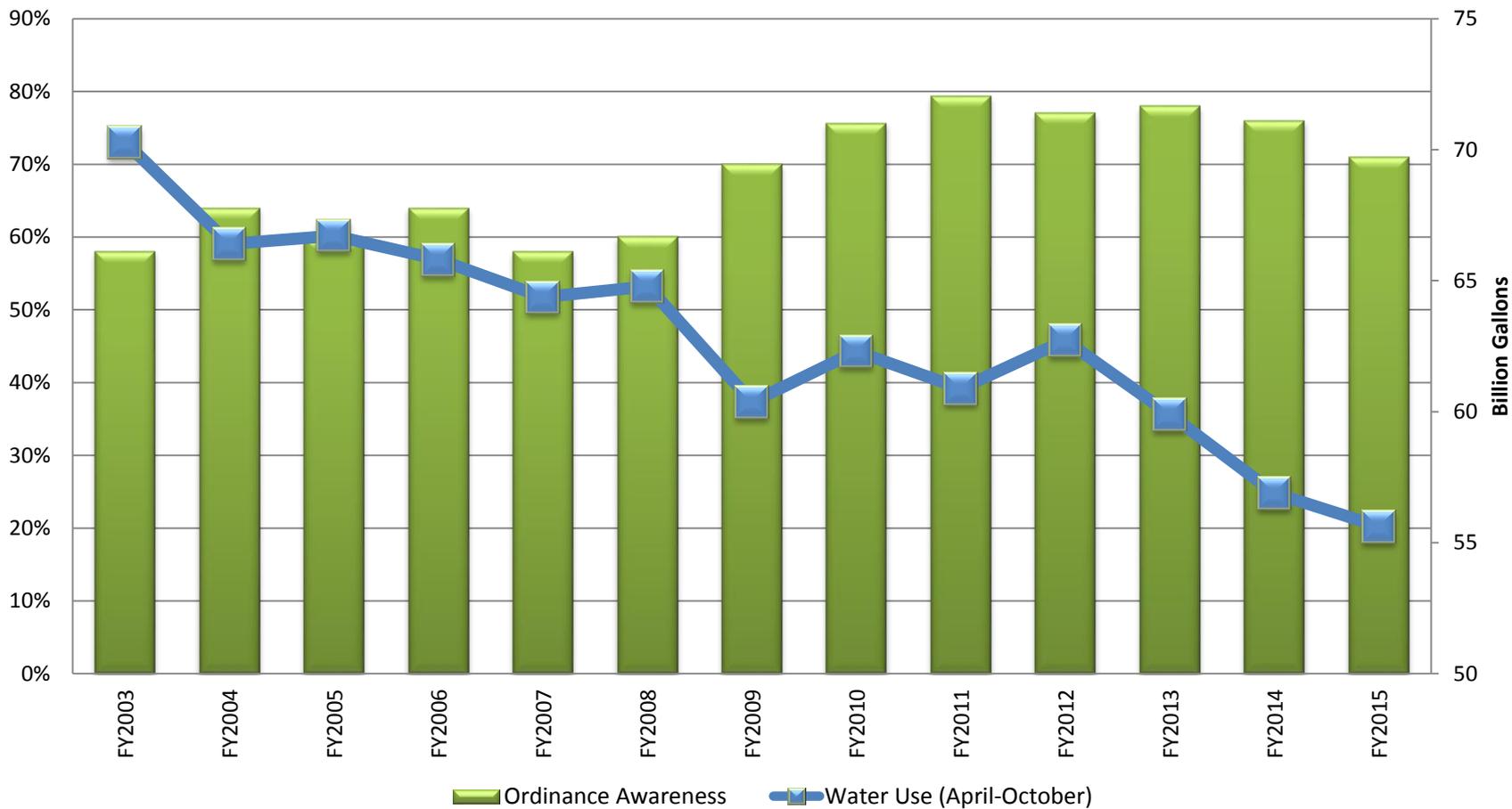
# Public Awareness Campaign

## *Reported Behavioral Changes vs. Water Use*

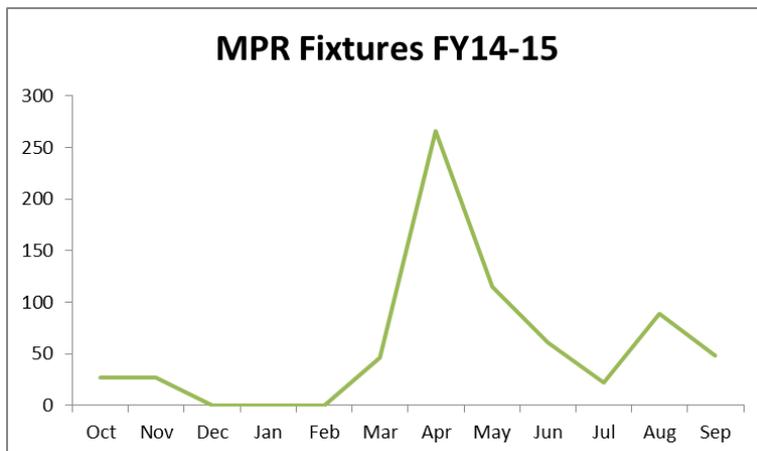
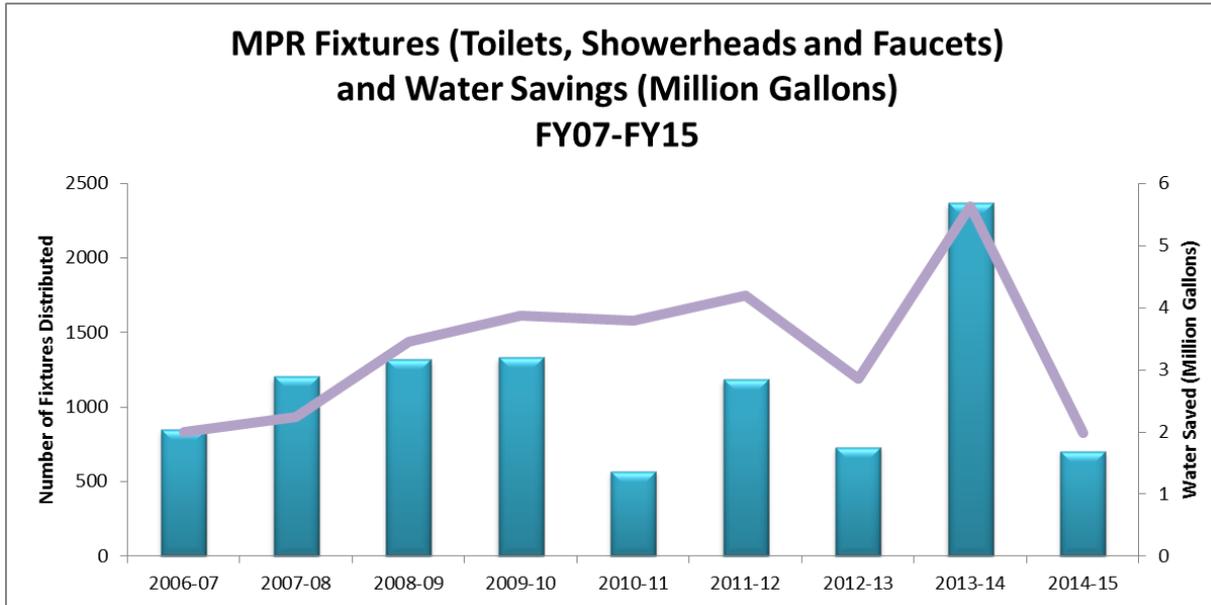


# Public Awareness Campaign

## *Ordinance Awareness vs. Water Use*



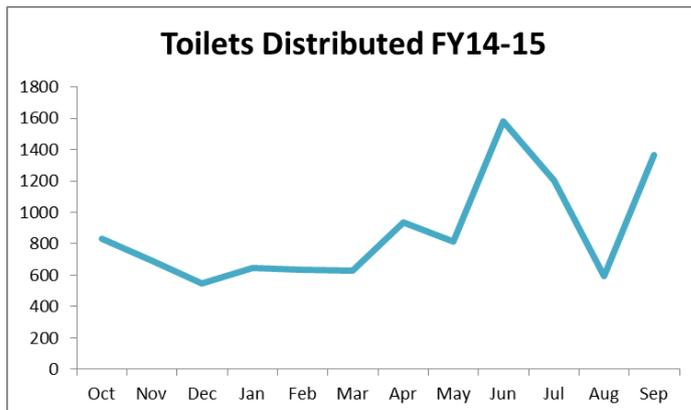
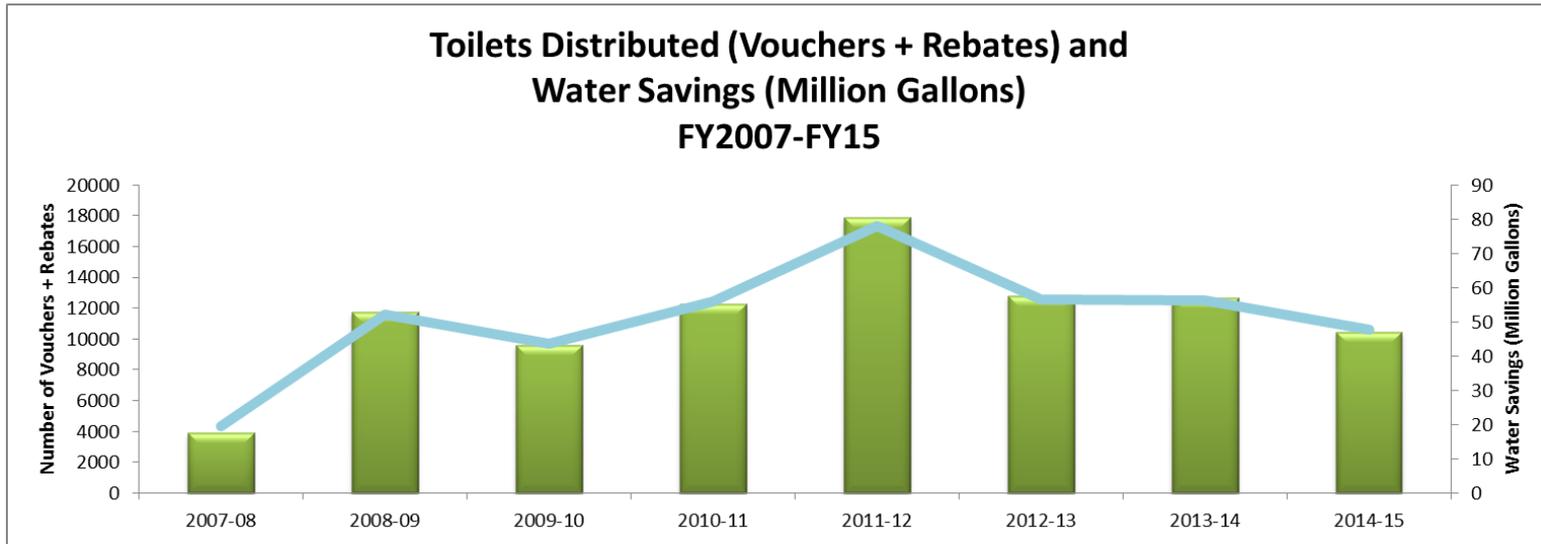
# Minor Plumbing Repair (MPR) Program Statistics



Cumulative Number of MPR Fixtures distributed program-to-date: **10,244**

Cumulative Water Saved: 30.04 MG

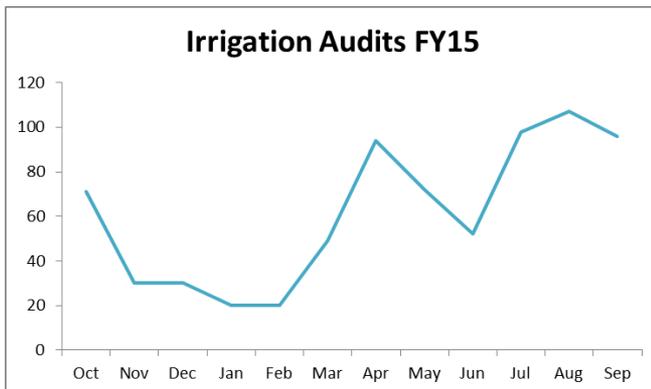
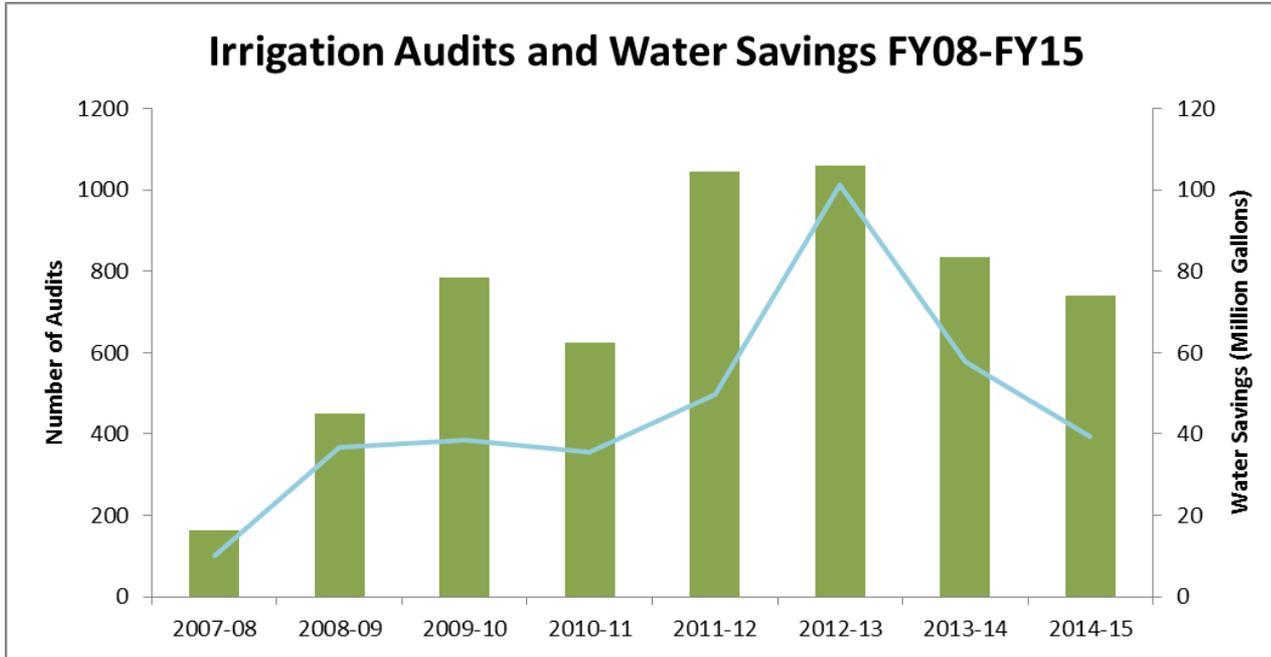
# New Throne for Your Home Program Statistics



Cumulative Number of Toilets Distributed  
(Vouchers + Rebates) : **91,389**

Cumulative Water Saved: **392 MG**

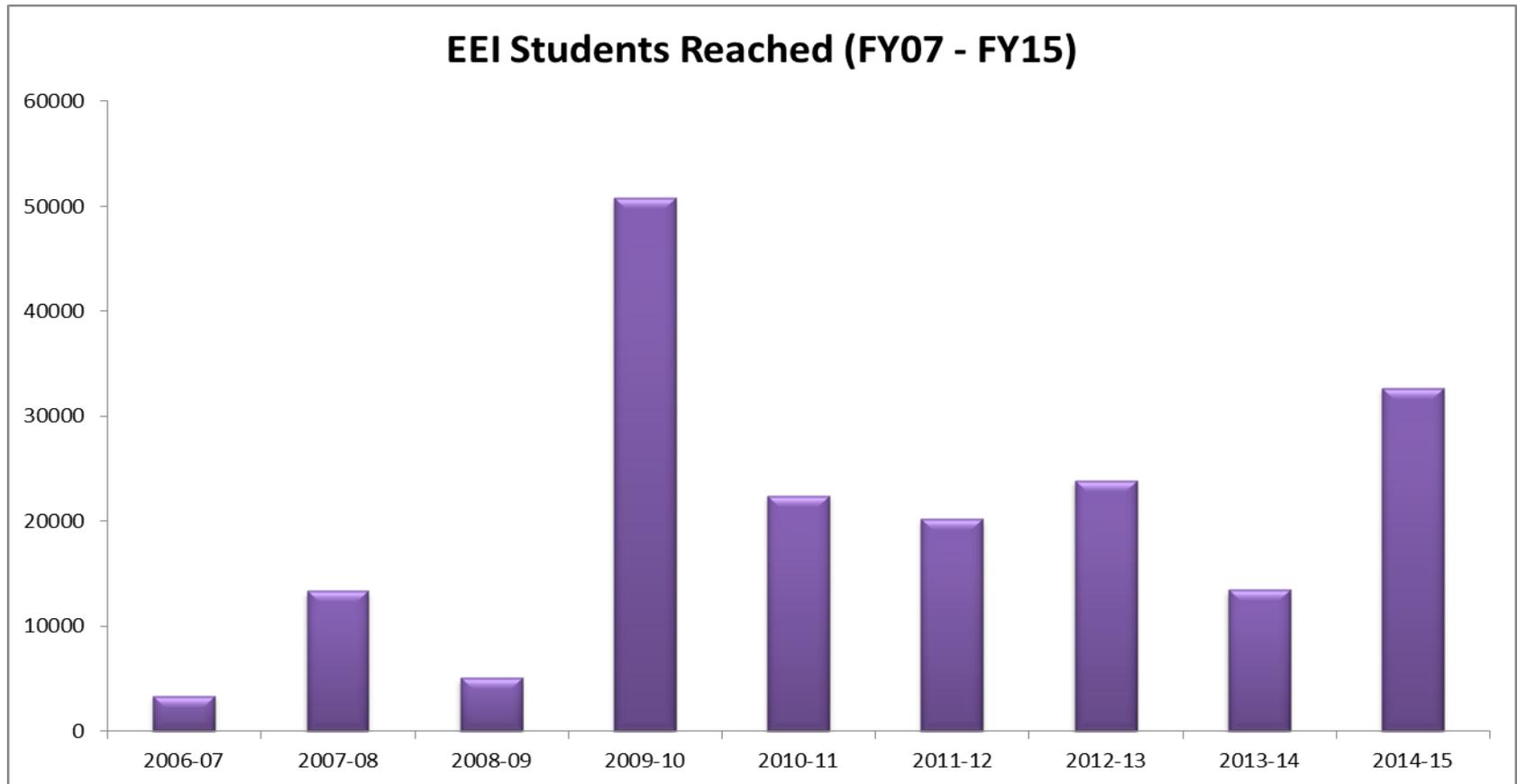
# Irrigation System Check-up Program Statistics



Total Number of Irrigation Audits  
Program-to-date: **5,701**

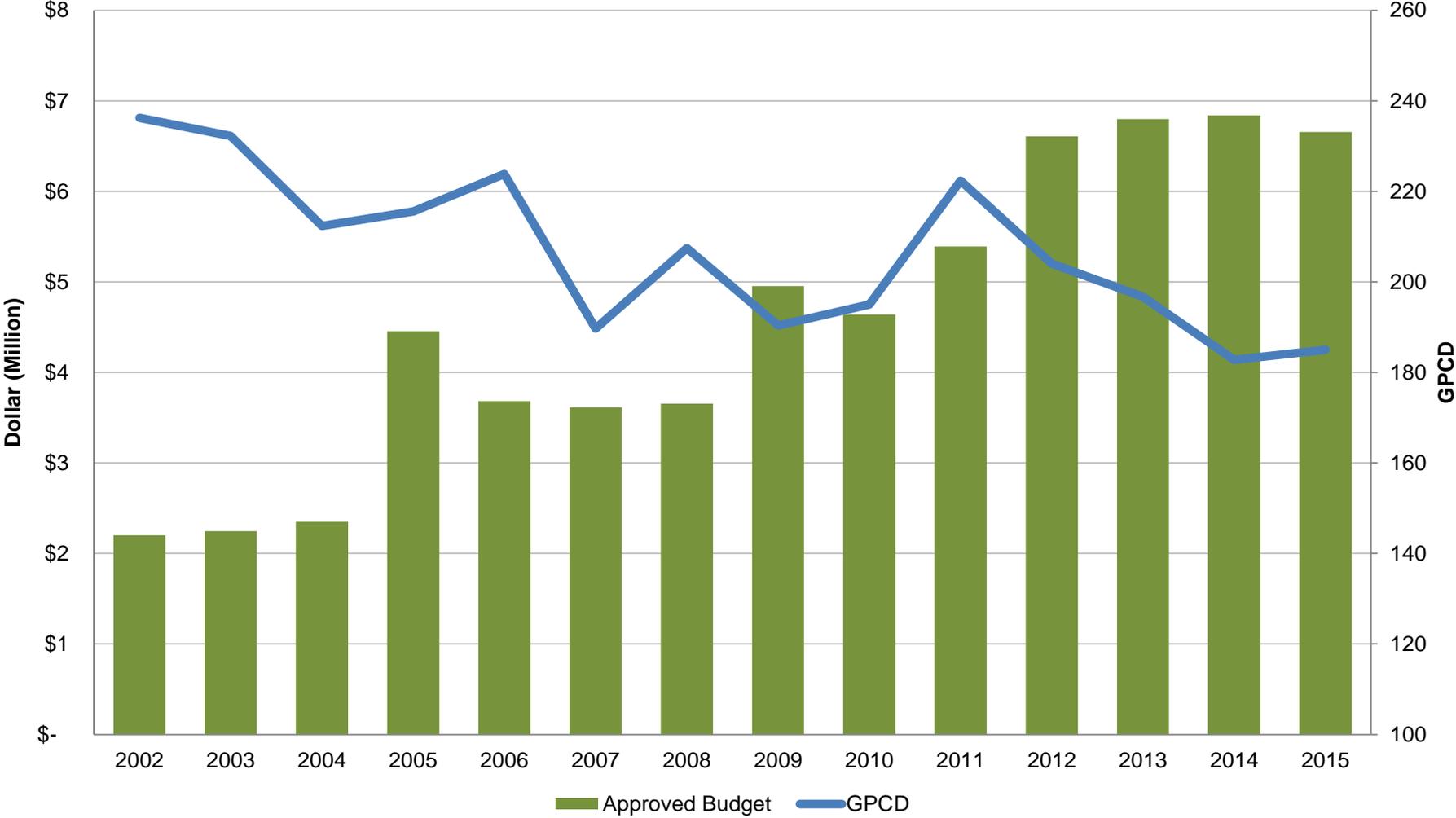
Potential Water Savings: 369 MG

# Environmental Education Initiative Program Statistics

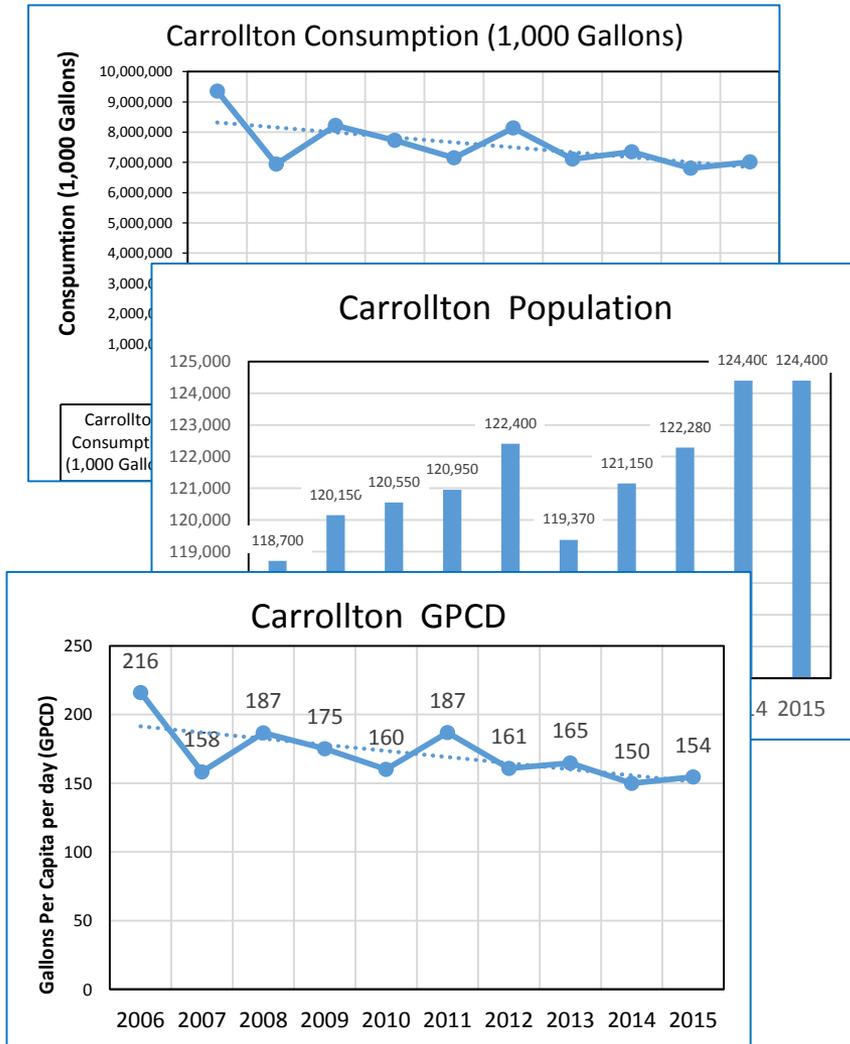


Note: Fiscal Year 2010 included continuous summer exhibits of middle school modules during a national traveling exhibit held at Fair Park's Museum of Nature and Science

# Water Conservation Budget v. GPCD



# Customer Cities Water Conservation Monitoring, Measurement, and Reporting



- **On an annual basis, DWU will track the following customer cities water use measures:**
  - Annual Consumption (Gallons per year)
  - Population
  - Gallons Per Capita Per Day (GPCD)
  - Max Day Usage by Customer
  - Max DWU System Usage
  - Other Measures as deemed necessary
- **Additionally, DWU will monitor customer cities conservation measures:**
  - Twice Weekly Watering
  - Time of Day Watering
  - Toilet Exchange Programs
  - Leak Detection and Repairs
  - Drought Responses
  - Other Measures as deemed necessary

(Note: The graphs shown are examples of the data)