



# Surf City Saves . . . More!

## Water Conservation Progress and Potential

City of Santa Cruz Water Department &  
Water Supply Advisory Committee  
May 21, 2015



# Welcome and Overview

Purpose of this evening's presentation:

- 1. Highlight recent accomplishments**
- 2. Review some recent research findings**
- 3. Discuss new opportunities to promote sustainable and efficient water use**

Interaction welcome: Opportunity throughout the presentation for questions and comments

# Water Service Area

## Areas served:

- Santa Cruz
- County
- Capitola

## Population:

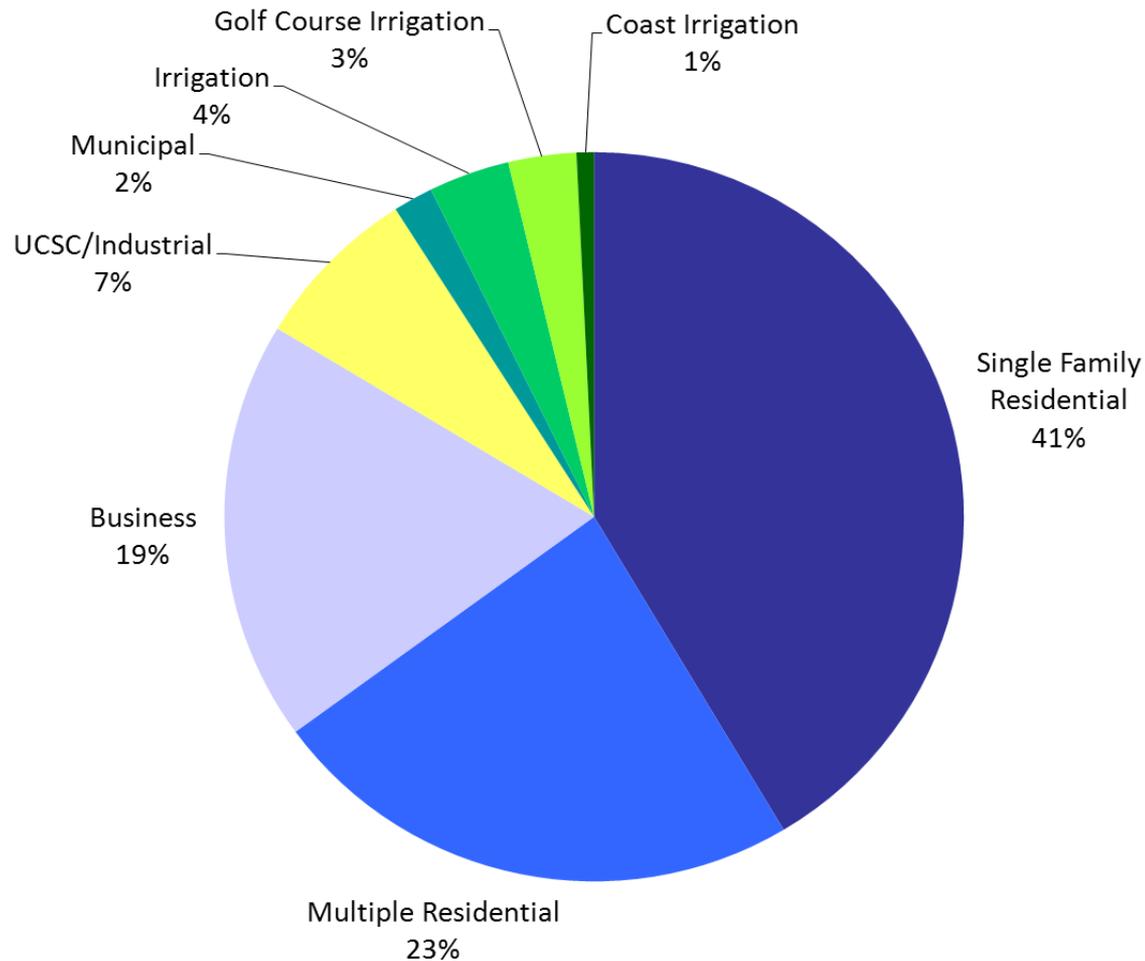
- 95,000

## Governing body:

- City Council



# Water Use by Customer Category



# Water Conservation Office

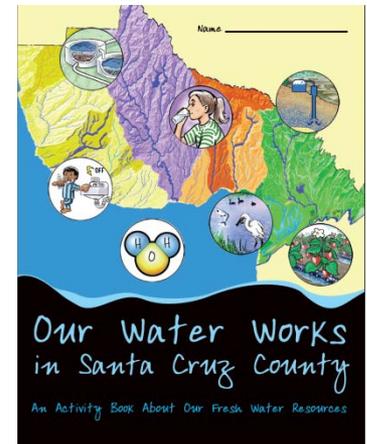
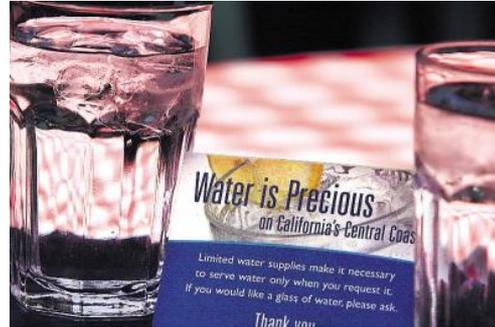
**Primary responsibility:** develop and implement programs that reduce customer demand for water and increase water use efficiency.

- 1. Public Awareness and Education**
- 2. Water Demand Monitoring Program**
- 3. Long-Term Water Conservation Programs**
- 4. Planning and Analysis**

# Public Awareness & Education

- Utility Newsletter
- Water Conservation website
- Literature
- Paid advertising campaigns
- Distribution of free devices
- Rain barrels
- Bill inserts
- Press releases
- School education
- Fix-a Leak Week
- Participation in regional water awareness activities
- Public meetings
- Community television

# Public Awareness & Education

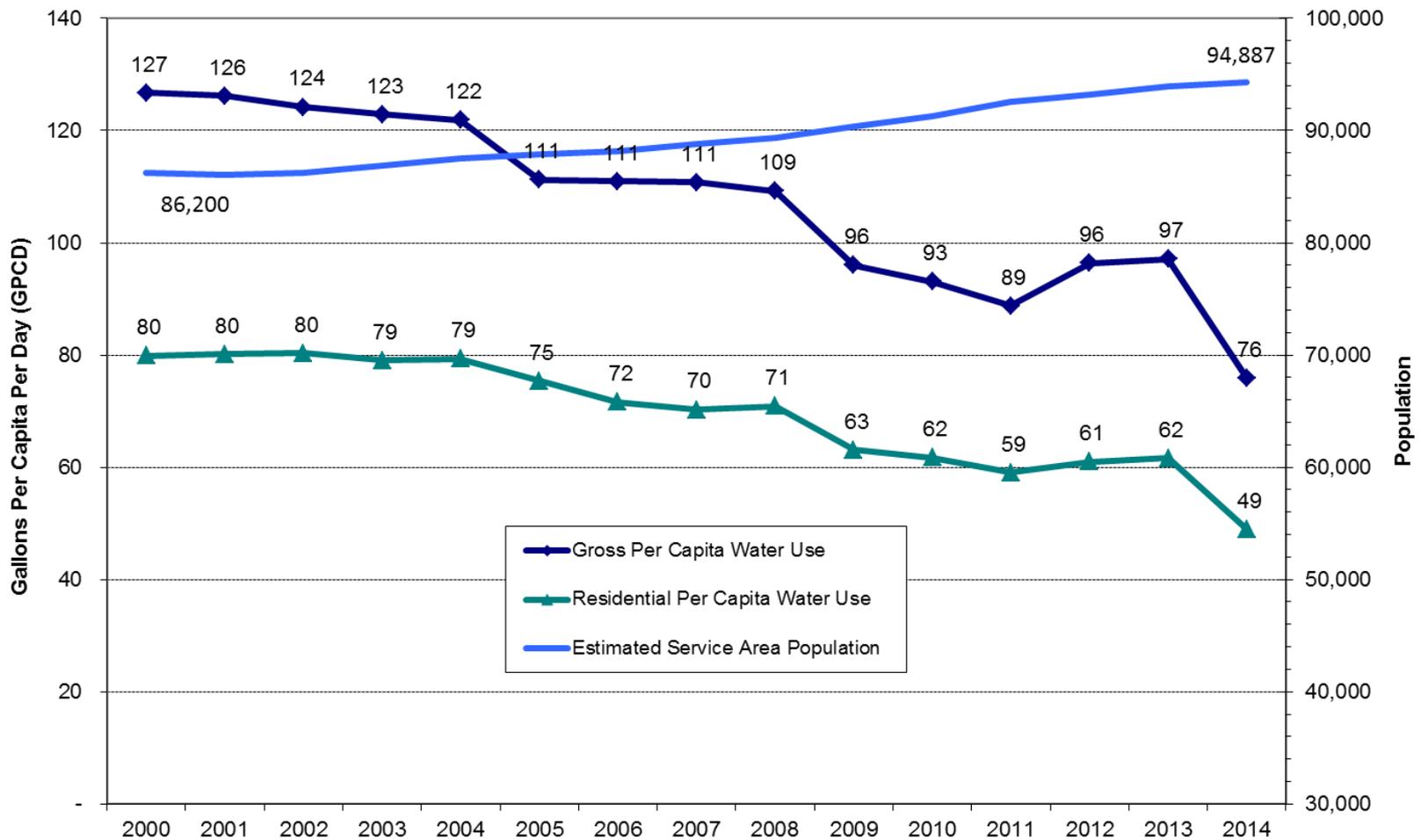


# Water Demand Monitoring Program

- Monitor water production and consumption trends
- Track weather and population data
- Evaluate per capita water usage “GPCD”
- Conduct annual distribution system water audit
- Track water used by new service connections
- Maintain water demand models
- Prepare water demand forecasts
- Evaluate conservation program savings
- Prepare annual report

# Water Demand Monitoring Program

## Per Capita Water Use and Service Area Population



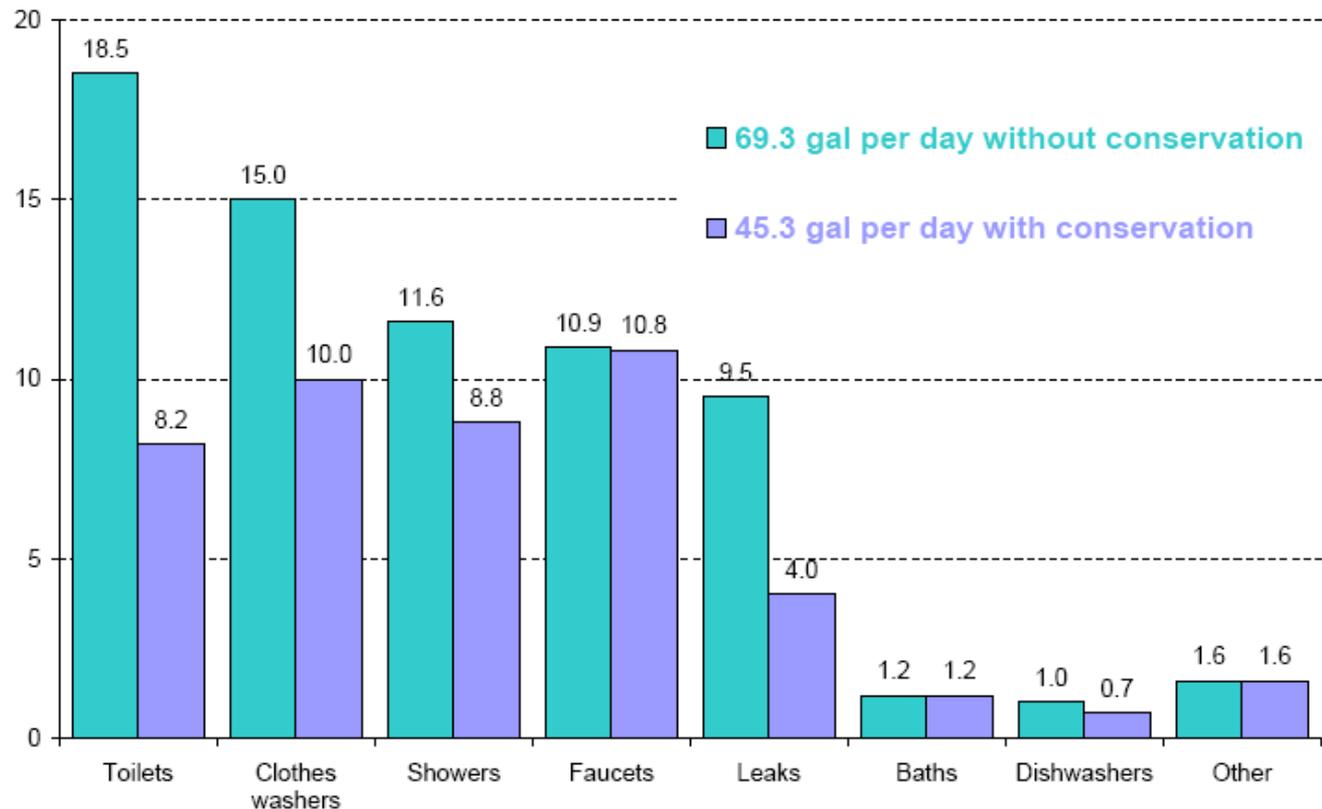
# Long-Term Water Conservation Programs

- Residential water audits or “surveys”
- Toilet rebate program
- Clothes washer rebate program
- Retrofit at time of sale regulations
- Water conservation oriented rate structure
- Commercial water audits through regional green business program
- Commercial rebates
- Landscape water conservation regulations
- Large landscape water use reports

# Long-Term Water Conservation Programs

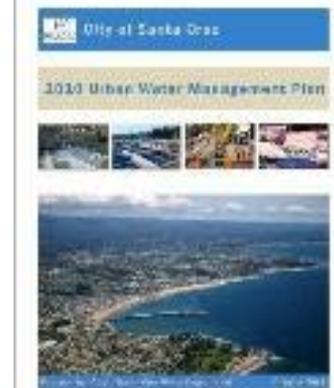
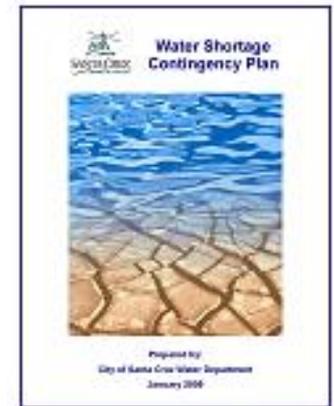


Residential indoor water use (gallons/person/day):

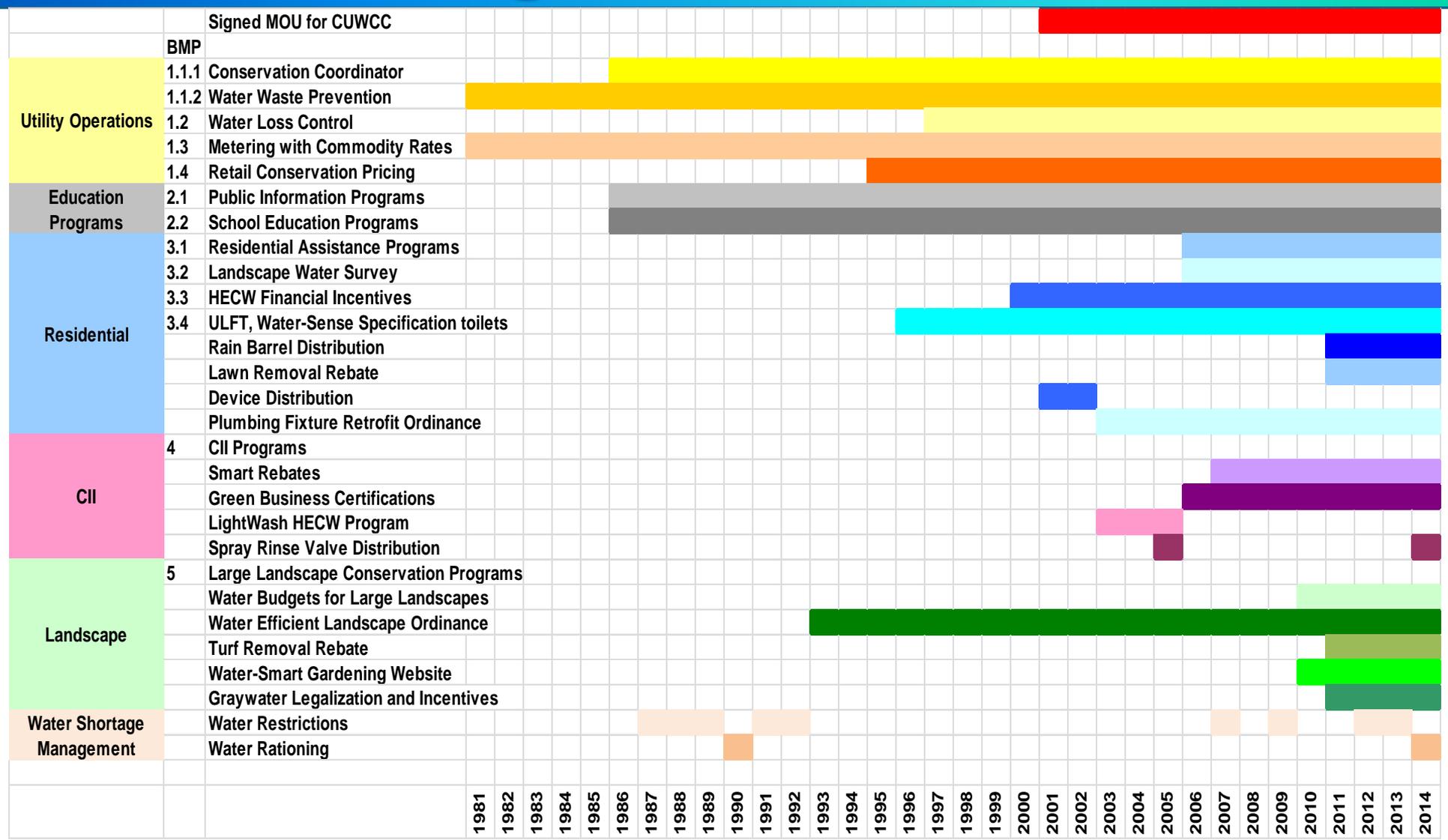


# Planning and Analysis

- Urban Water Management Planning
- **Water Shortage Contingency Plan 2009 and 2012-2015**
- Water Use Baseline Survey and Updated Water Conservation Master Plan
- Assistance to City's water supply planning efforts



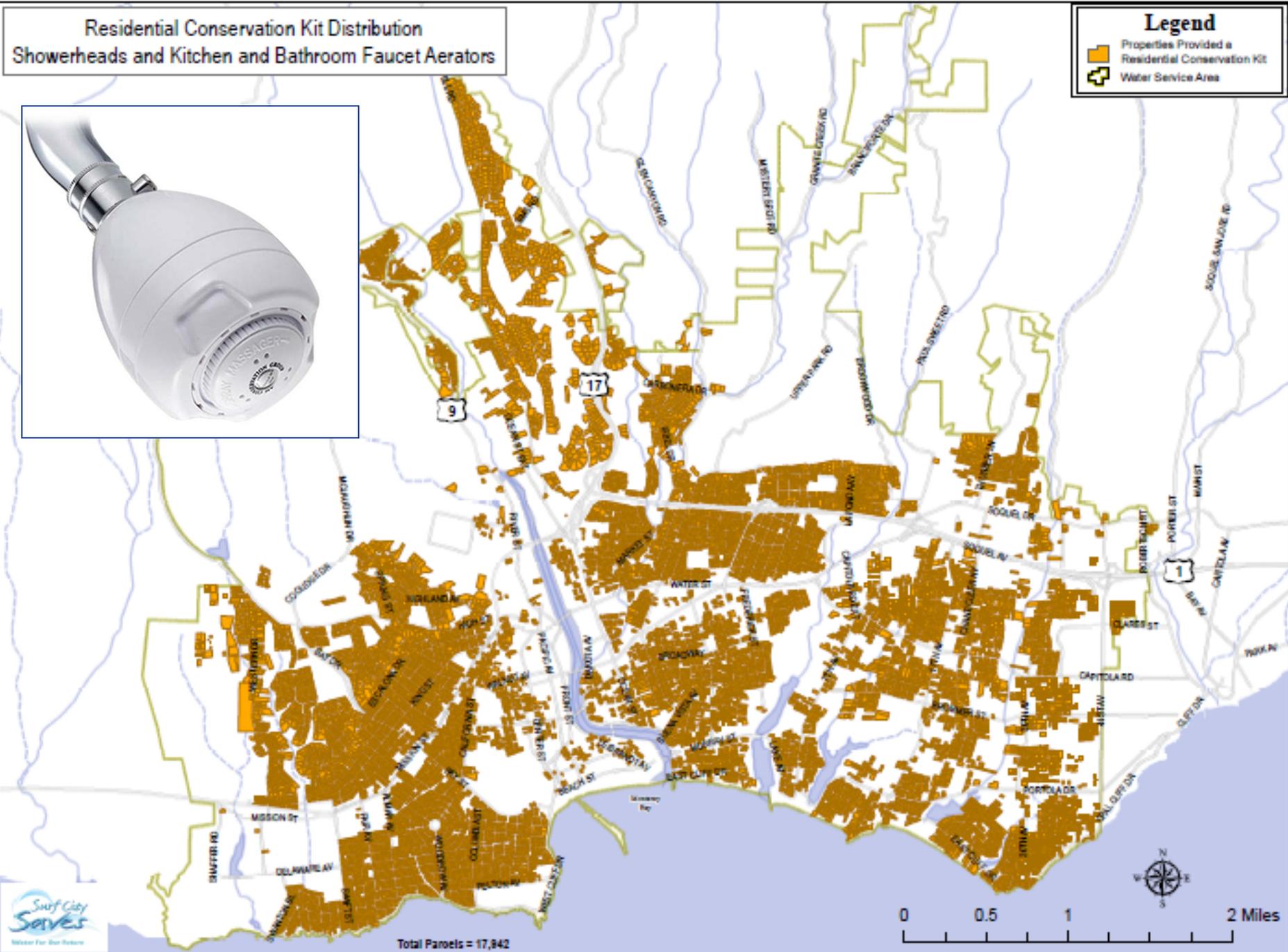
# Water Conservation Program Timeline



# Residential Conservation Kit Distribution Showerheads and Kitchen and Bathroom Faucet Aerators

**Legend**

-  Properties Provided a Residential Conservation Kit
-  Water Service Area



Total Parcels = 17,942

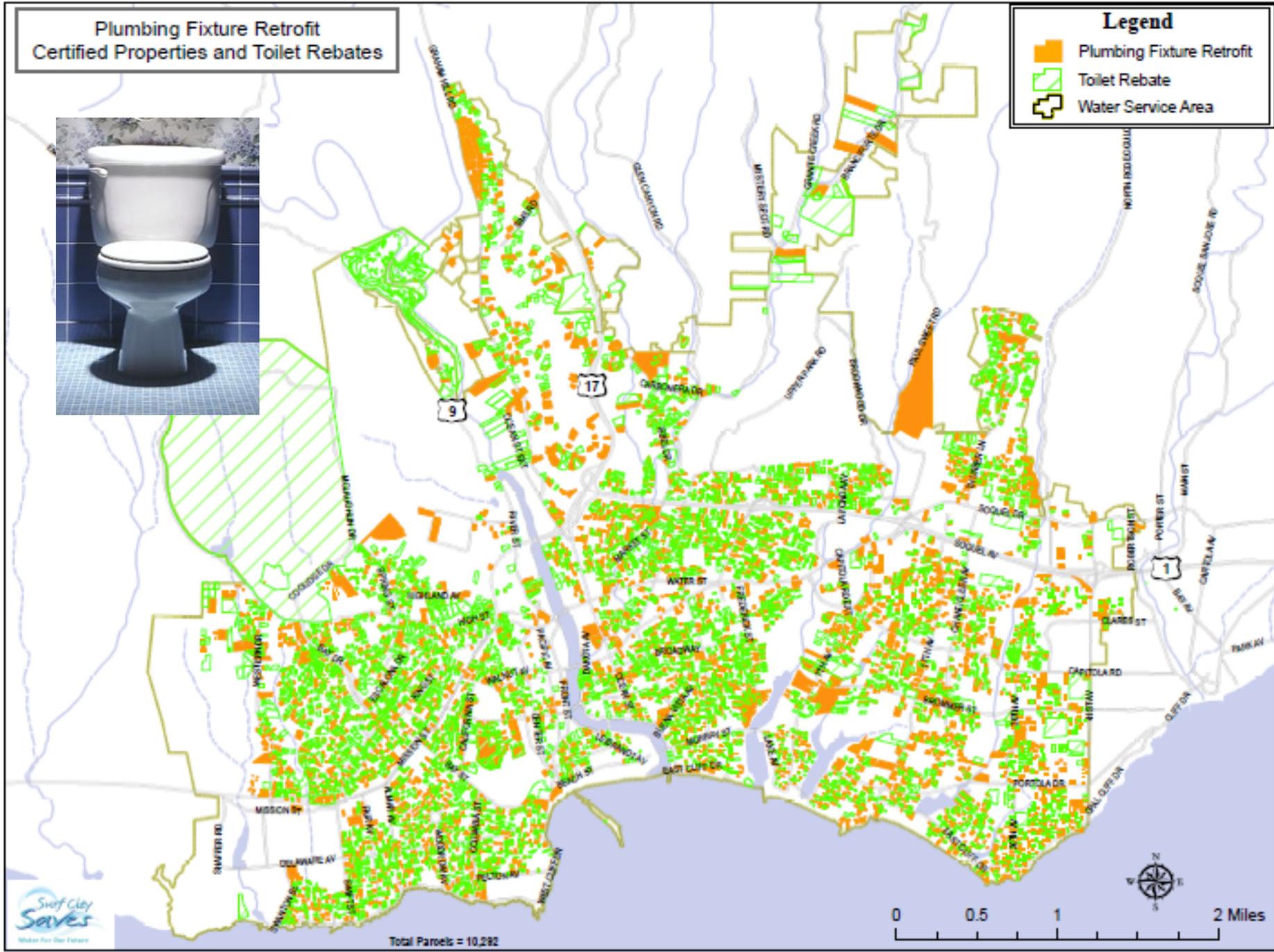


# Plumbing Fixture Retrofit Certified Properties and Toilet Rebates



### Legend

-  Plumbing Fixture Retrofit
-  Toilet Rebate
-  Water Service Area

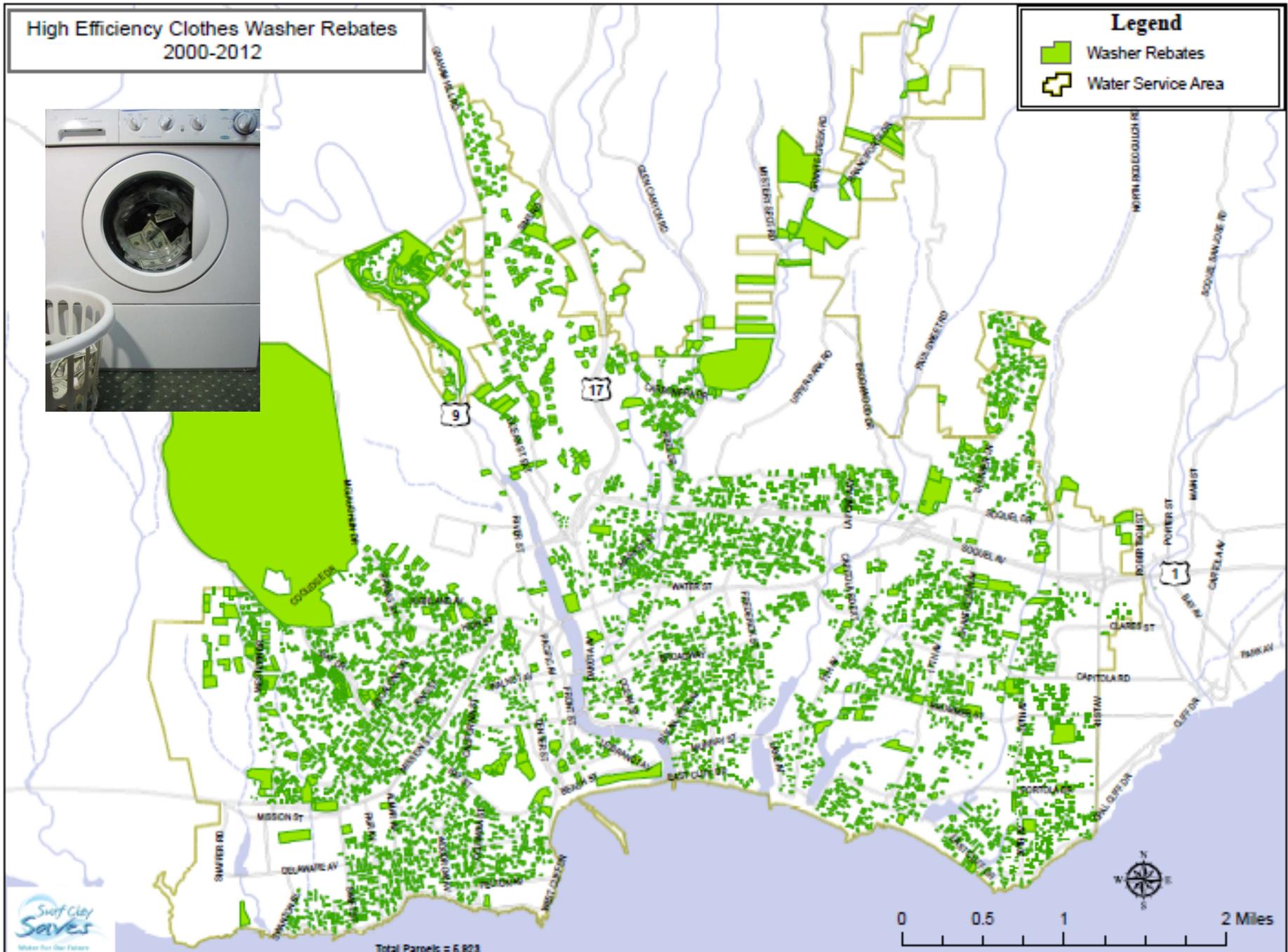


Total Parcels = 10,292

# High Efficiency Clothes Washer Rebates 2000-2012



- Legend**
- Washer Rebates
  - Water Service Area



Total Parcels = 6,923

# Large Landscape Water Budgets: Shaping Peak Season Water Demand



# Background on Large Landscape Water Budgets

Required for properties with dedicated irrigation accounts under the California Urban Water Conservation Council MOU.

Signatory agencies agree to:

- Provide notices each billing period showing the relationship between budget and actual consumption
- Offer technical assistance to reduce water use to those accounts that are 20% over budget.

# Program Goal

Use water budgets to **minimize overwatering** while promoting healthy, attractive landscapes



# Getting Going on Water Budgets

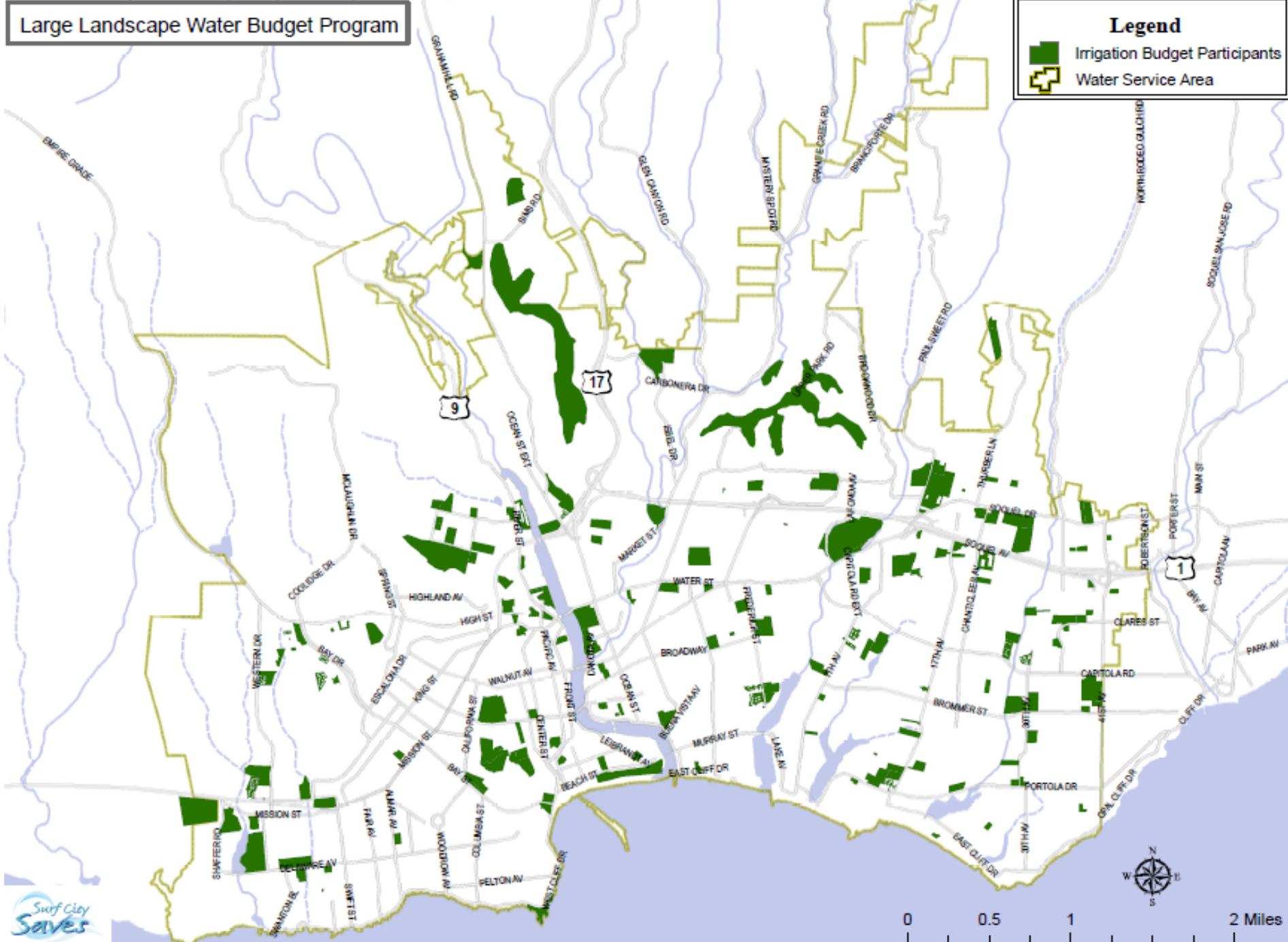
- **Contracted with Waterfluence in June 2010**
  - Primary author of the CUWCC's Guidebook on Large Landscape Conservation Programs
  - Currently working with water agencies across California
- **Early 2010 - changed all large irrigation accounts to monthly billing**



# Large Landscape Water Budget Program

**Legend**

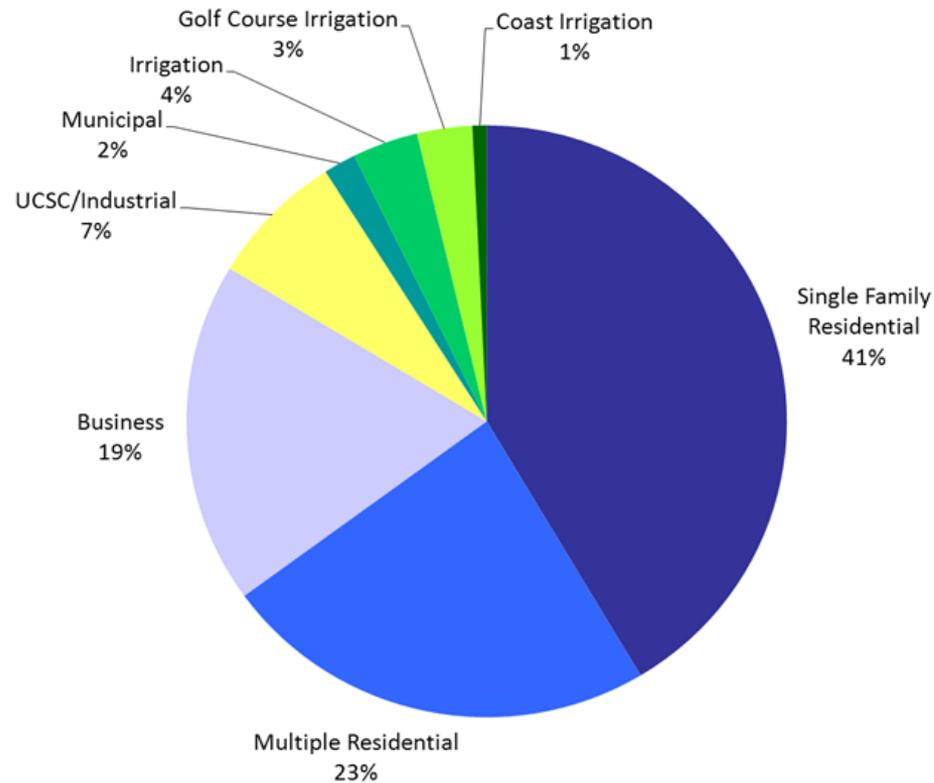
-  Irrigation Budget Participants
-  Water Service Area



Total Parcels = 193



# Irrigation Account Water Use



- Parks
- Schools
- Golf Courses
- Cemeteries
- Businesses
- HOAs
- Caltrans
- Church

# What is a “Water Budget”?

Amount of water needed to meet plant water needs.

- Landscape area
- Plant types
- Real-time weather data

$$\text{BUDGET} = \text{AREA} * \left[ \frac{K_L * E_{To} - E_{Rain}}{IE} \right] * C$$



# Landscape Water Use Report

August 2013

SiteID: SC-01a

## Prepared For:

Site Name: HarveyWestPark  
 Main Contact: Meta Rhodeos  
 Landscape Firm:  
 Other Contacts: Tom Kemp, Mia Duquet, Mauro Garcia,  
 Lori McCammon

## Acct# and Service Address:

027-02950-011; 0 Harvey West @ Dubois  
 027-02999-001; 300 Evergreen St  
 027-03400-011; 0 Harvey West Annex  
 027-03500-011; 0 Evergreen St  
 027-03505-011; 0 Harvey West Park  
 027-03520-011; 0 Harvey West Lit Lge

## Site Description:

Measurement Method: [View Site Map](#)  
 Measurement Date: 7/10/2012  
 Irrigated Turf Area (FT2): 576,180  
 Irrigated Other Area (FT2): 2,889  
 Pool/Pond Area (FT2): 5,180  
 Indoor Water Cctf/Bill: 0



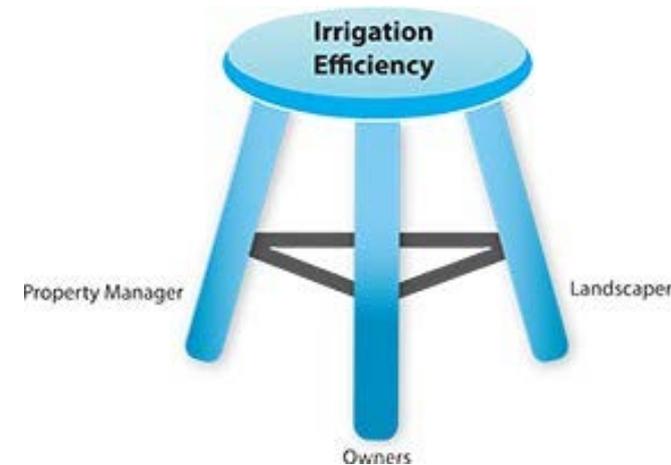
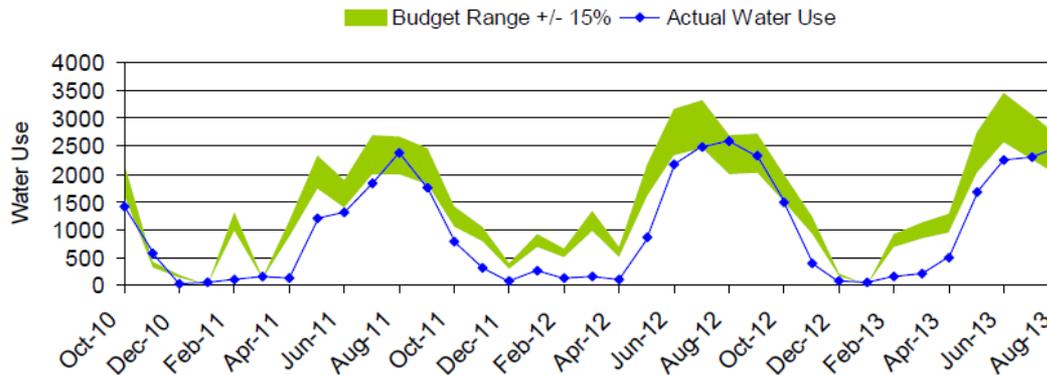
CITY OF SANTA CRUZ  
 HARVEY WEST PARK  
 809 CENTER ST RM 101  
 SANTA CRUZ CA 95060-3826

## Site Percentile

90

100=top score

## Water Use History



Savings Potential	Last Month	Last 12 Months	Last 24 Months	Last 36 Months	Read Date	Actual Water Ccf	Budget Water Ccf	Over Water Ccf	Over Water %	Weather ETo-Rain Inches
					8/9/2013	2,475	2,318	157	6%	4.64
Over Water Ccf	157	211	455	825	7/9/2013	2,313	2,653	0	0%	5.31
Over Water %	6%	2%	2%	2%	6/10/2013	2,239	3,008	0	0%	6.02
Dollars Lost \$	\$627	\$843	\$1,818	\$3,301	5/8/2013	1,673	2,383	0	0%	4.77
					4/10/2013	502	1,118	0	0%	2.24
					3/12/2013	205	984	0	0%	1.97
					2/11/2013	156	802	0	0%	1.61
					1/8/2013	54	0	54	100%	0.00
					12/10/2012	88	185	0	0%	0.37
					11/8/2012	385	1,064	0	0%	2.13
					10/9/2012	1,502	1,739	0	0%	3.48
					9/10/2012	2,317	2,373	0	0%	4.75

## Messages

Stage 1 Water Restrictions are in Effect May 1- October 31, 2013. No landscape watering between 10:00am-5:00pm. For more information visit [www.cityofsantacruz.com/waterrestrictions](http://www.cityofsantacruz.com/waterrestrictions) or call 831-420-5230.

# Field Survey Evaluation

## Sprinkler Water Runoff



Clogged



Tilted



Misaligned



Sunken

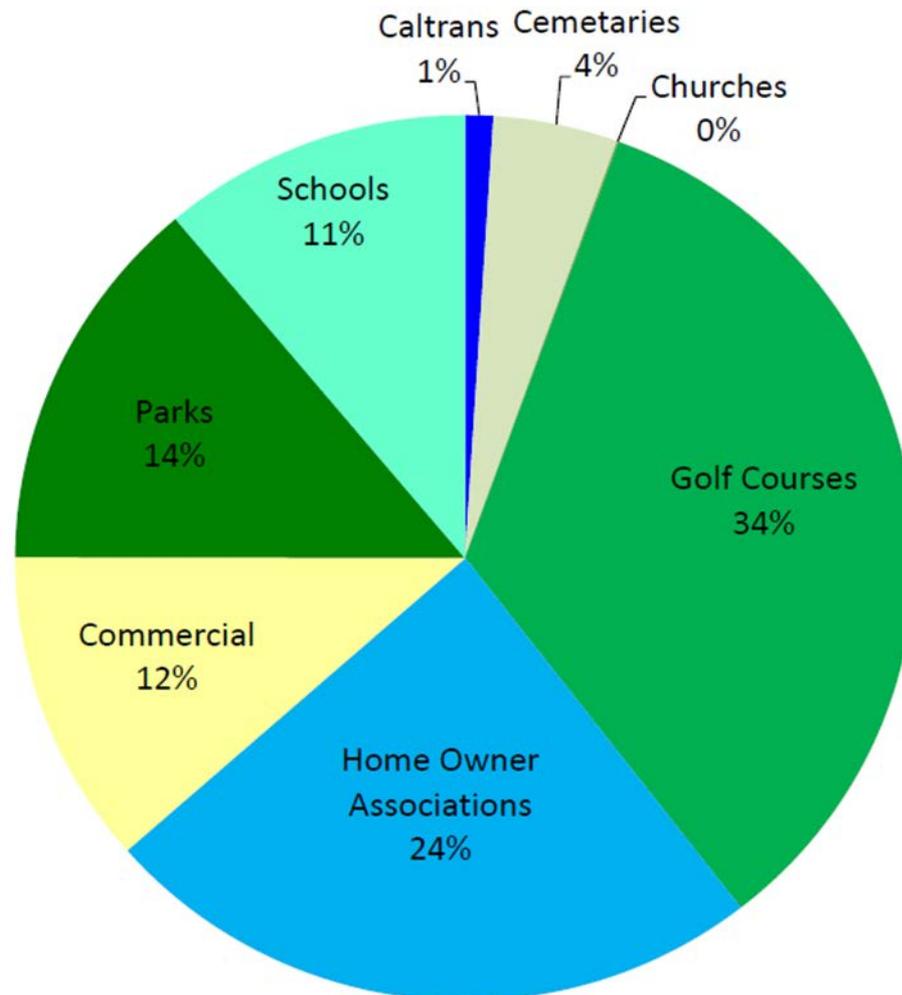


Leak

# Large landscape Program Stats

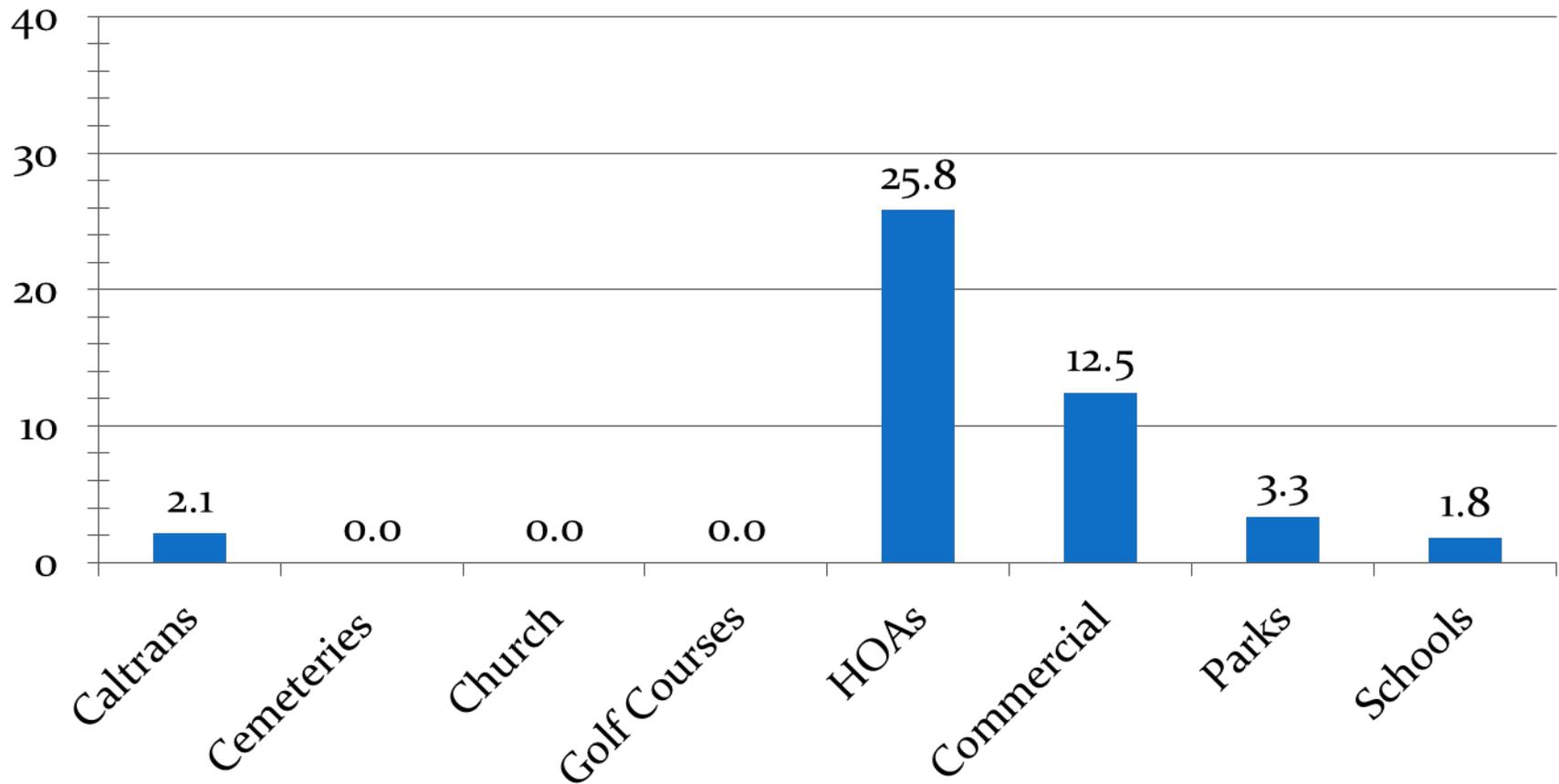
- 187 sites
- 267 water accounts
- 17.7 million square feet of landscaping
- 78 percent turf
- ~ 250 million gallons per year
- Average application rate: 2.0 feet/year

# Water Use Breakdown



# Where Overwatering Occurs

by volume (million gallons)



## Water Use History

Zoom: **6m** | YTD | 1y | 3y | All

19 Site Score

Compliance Normal



Water use and its CO<sub>2</sub>e: 1 CO<sub>2</sub>e = 100 gallons

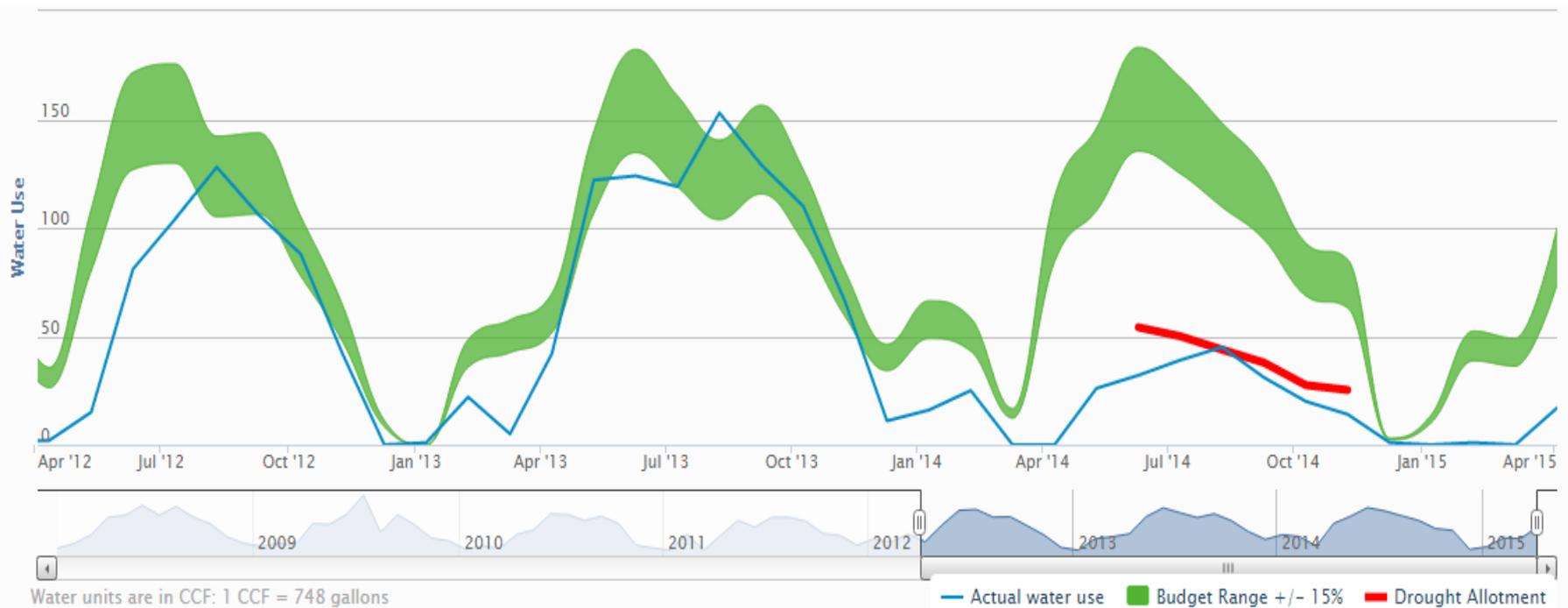
— Actual water use    Budget range  $\pm 15\%$     Drought Allocation

# Program Water Savings

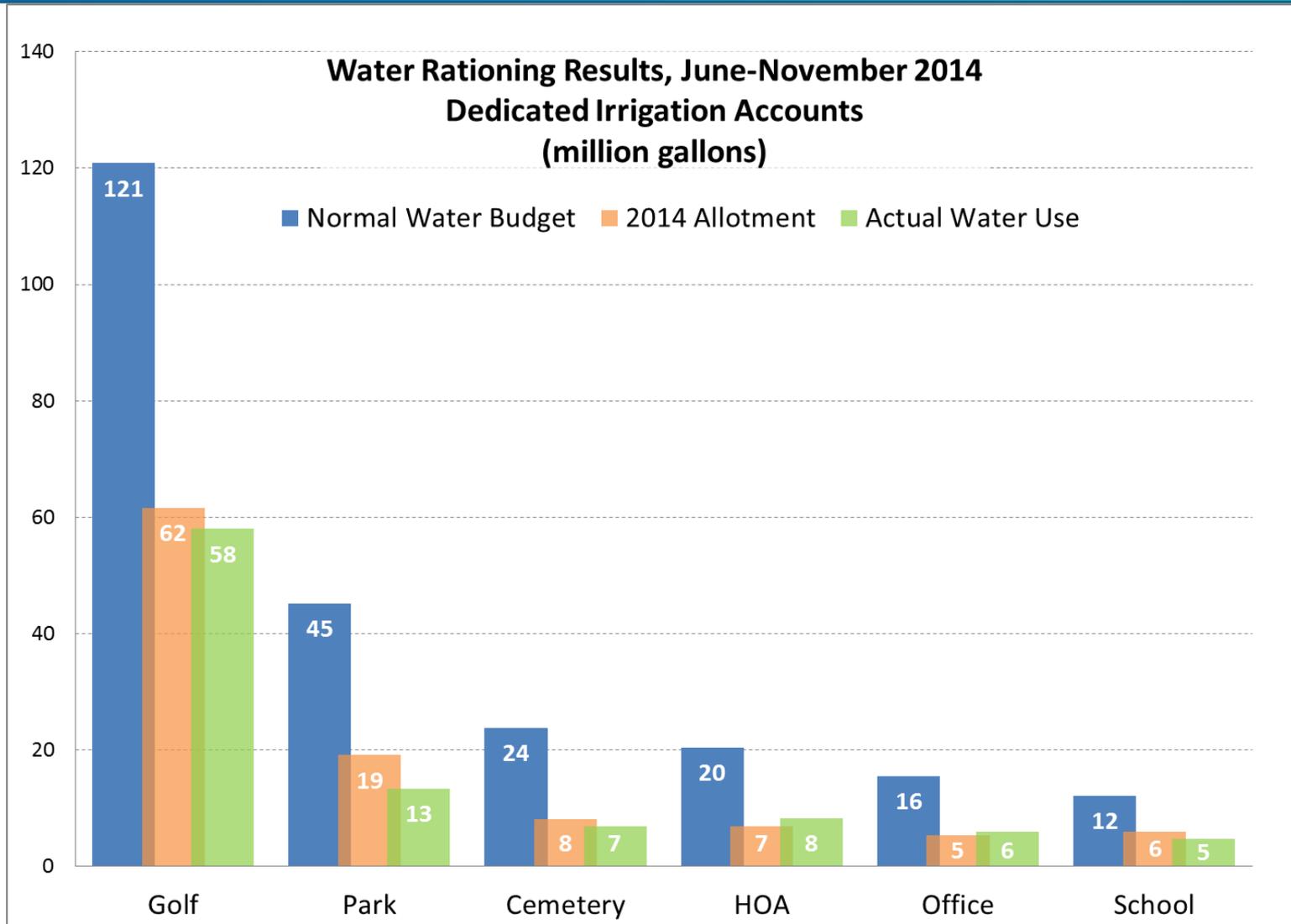
Overwatering	2012	2013	Savings
Feet/year	0.36	0.24	-0.12
Percent	18%	13%	-5%
Volume (mgy)	45.2	30.1	-15.1

# Using Water Use Report as a Drought Management Tool

Rationing allotment = 1/3 of budget



# 2014 Rationing Results



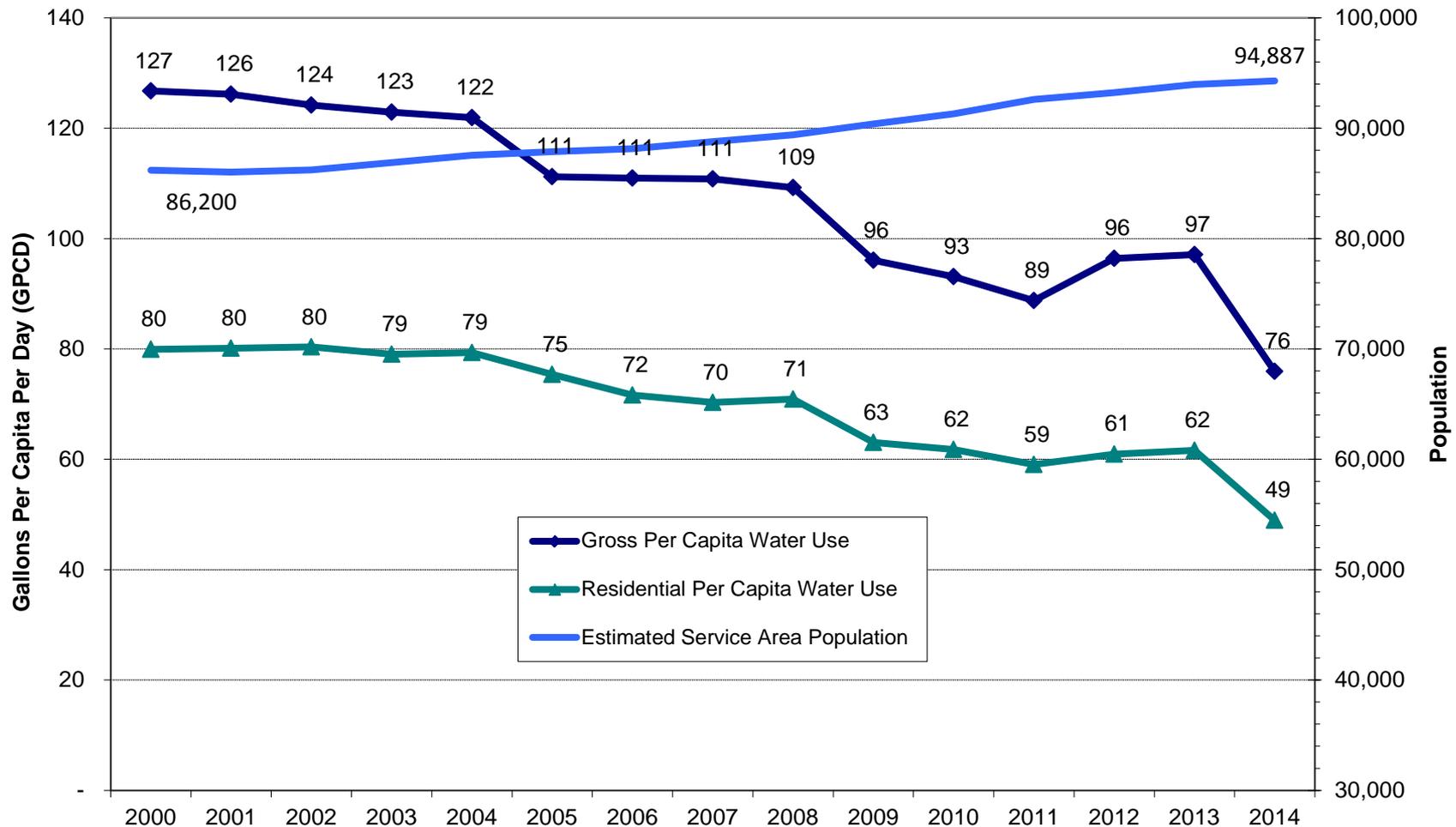
# Per Capita Water Use

- Water Conservation Act of 2009:  
New Framework for Urban water Conservation
- Water use target of reducing per capita urban water use by 20% by 2020

# Per Capita Water Use

## 24% Decline Since 2000

Per Capita Water Use and Service Area Population



# Need for New Water Efficiency Plan

## **Timing:**

- Existing plan completed and due for update

## **Priority:**

- Strengthening water conservation efforts identified as top priority in City Council's 3 year strategic plan

## **Need for Information:**

- What is the remaining conservation potential?
- Saturation level of water efficient equipment?

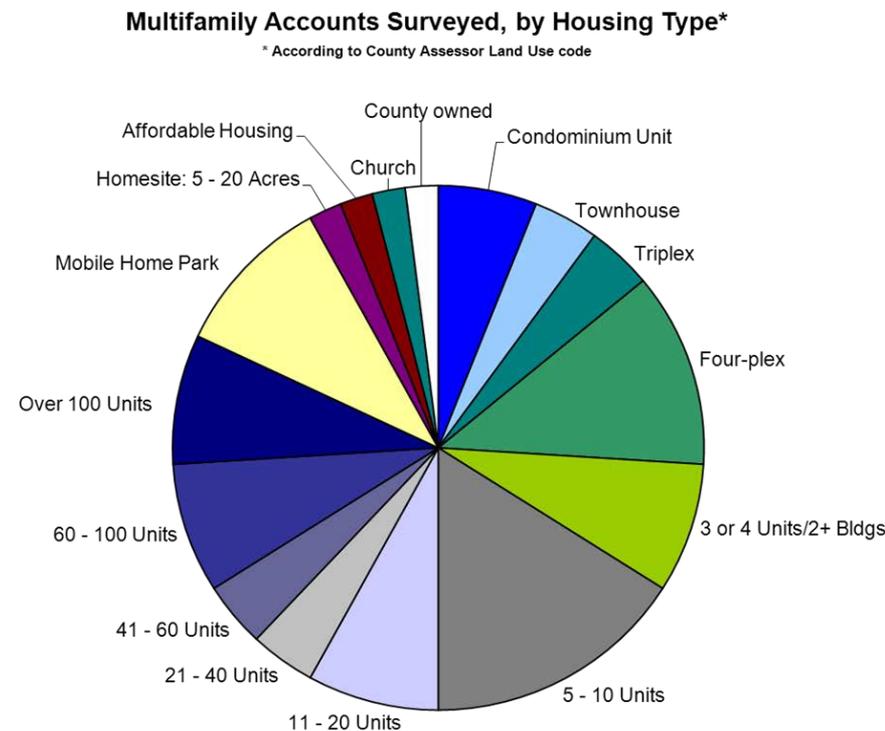
# Baseline Survey

## Background and Purpose

- Take stock of progress accomplished over previous decade
- Census the proportion of water conserving fixtures, devices, equipment, and features in residential and commercial properties across the service area
- Provide a basis for estimating remaining water conservation potential through 2030
- Help select, target, and design future programs

# Who Was Surveyed?

- **150** single family and 2-unit homes
- **127** multifamily dwelling units and common area in 50 different complexes
- **119** commercial sites including hotel/motels, restaurants, office buildings, retail stores, schools hospitals, medical/dental facilities, laundromats



# What Was Surveyed?

- **Property and household characteristics:** lot size, age of construction, occupancy, utility billing data, water pressure
- **Indoors:** number and type of plumbing fixtures and appliances; flow rates and flush volumes
- **Outdoors:** landscape area, plant types, types of irrigation systems and controllers in use, exterior water features
- **Commercial buildings:** facility type, employees, equipment, sanitary, process, or cooling water uses

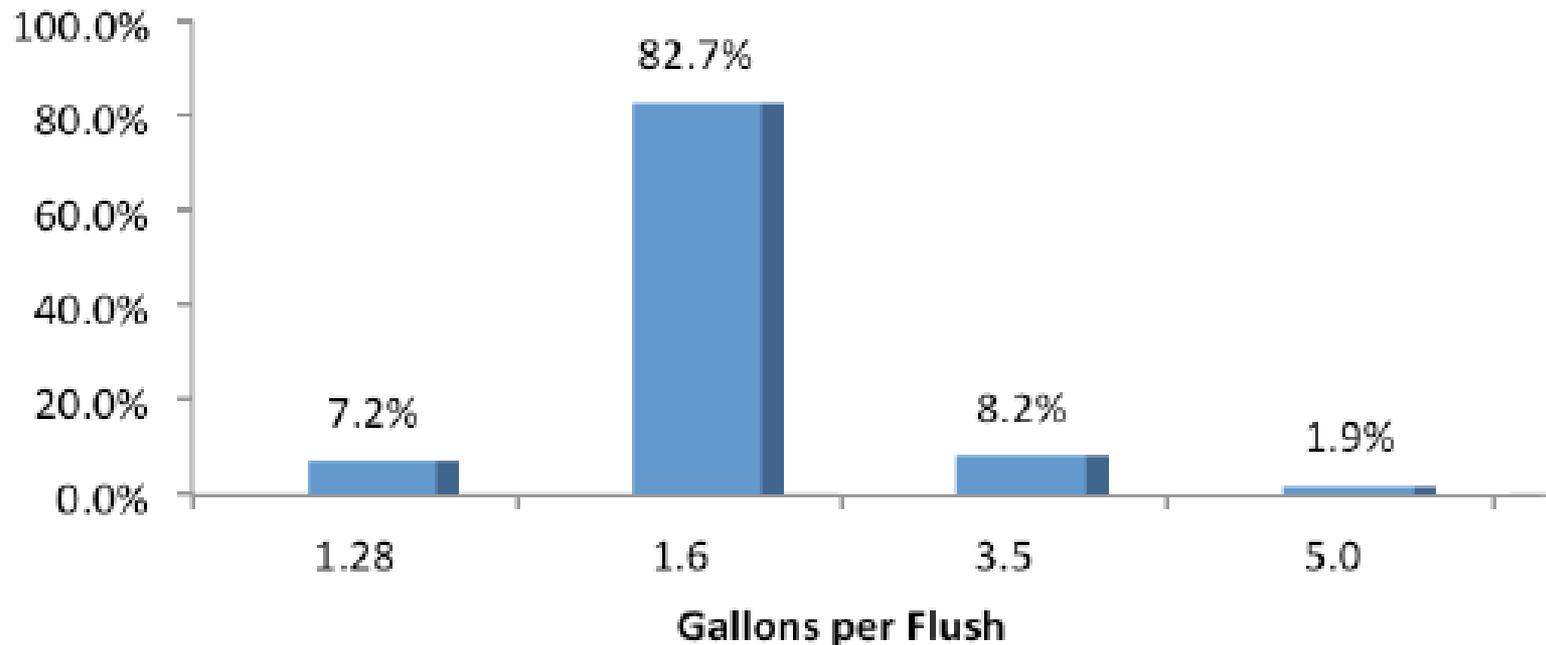


# Indoor Water Use Characteristics, by sector

	Efficiency standard	Single family domestic	Multifamily domestic	Commercial
Toilets	1.6 gal/flush or less	90%	91%	96%
Showerheads	2.5 gal/min or less	92%	98%	95%
Bathroom Faucets	2.2 gal/min or less	90%	82%	Varies
Kitchen Faucets	2.2 gal/min or less	71%	82%	63%
Clothes Washers	Front-loading type	63%	46%	52%

# Single Family Home Results

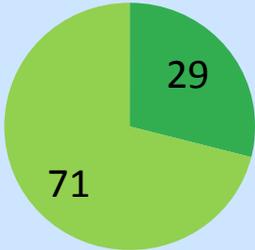
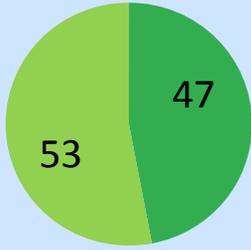
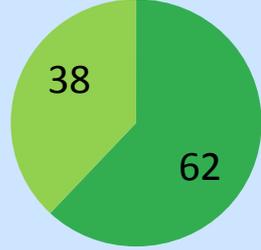
## Toilet Flush Volume Distribution Mean=1.8; Median=1.6



# Lot Characteristics

	Single Family	Multi-Family	Commercial
Mean Lot Size (sq. ft.)	8,574	~50,000	~104,450
Median Lot Size (sq. ft.)	6,316	9,600	14,810
Sites with Landscaping	98%	73%	54%
Average Lot Area in Landscaping sq. ft. (%)	1,884 (22%)	5,800 (12%)	4,835 (5%)

# Landscaping Characteristics

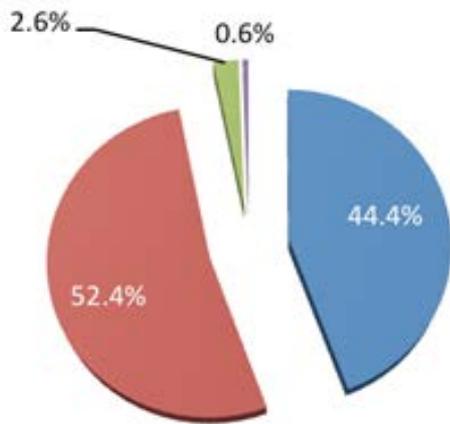
	Single Family	Multi-Family	Commercial												
Sites with Turf	48%	51%	15%												
Average Turf Area (sq. ft.)	542	2,744	3,005												
Percent of Landscape Planted in Turf	 <table border="1"><tr><td>Non-turf</td><td>71</td></tr><tr><td>Turf</td><td>29</td></tr></table>	Non-turf	71	Turf	29	 <table border="1"><tr><td>Non-turf</td><td>53</td></tr><tr><td>Turf</td><td>47</td></tr></table>	Non-turf	53	Turf	47	 <table border="1"><tr><td>Non-turf</td><td>38</td></tr><tr><td>Turf</td><td>62</td></tr></table>	Non-turf	38	Turf	62
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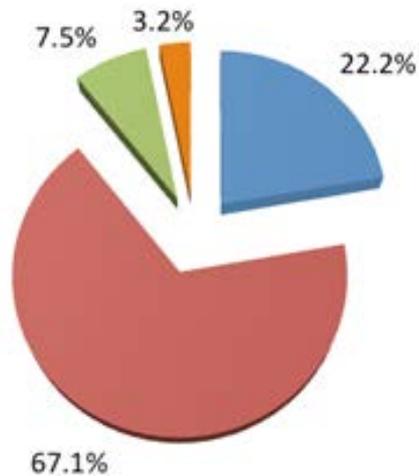
- Turf
- Non-turf

# Irrigation Equipment

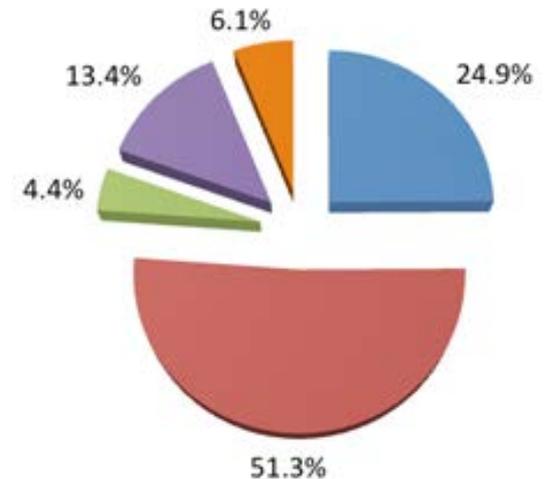
## Single Family



## Multi-Family



## Commercial



■ Drip

■ Spray

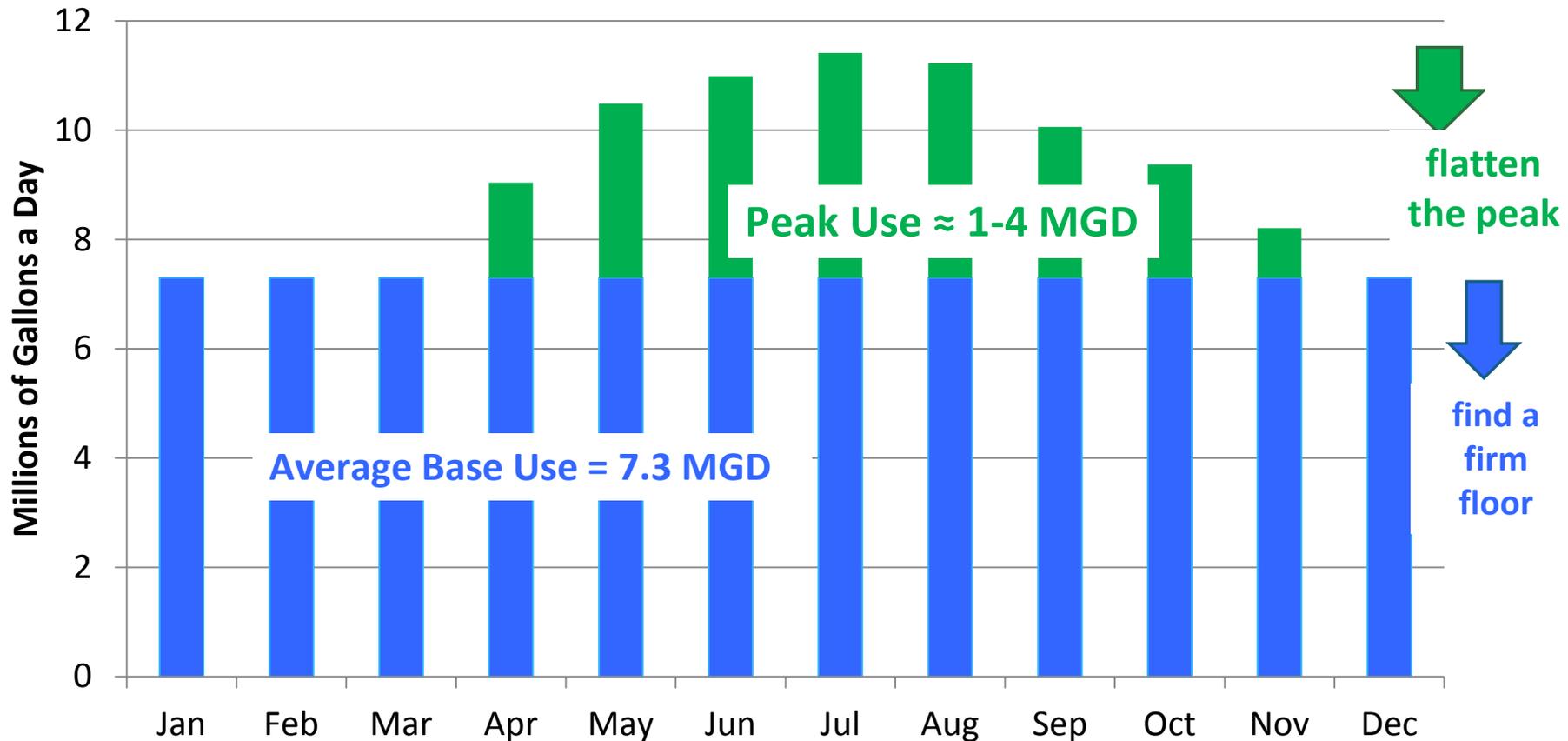
■ Rotor

■ Hose End

■ Not Available

# Base vs. Peak Water Use

Peak is mainly outdoor use,  
Base is mainly indoor use





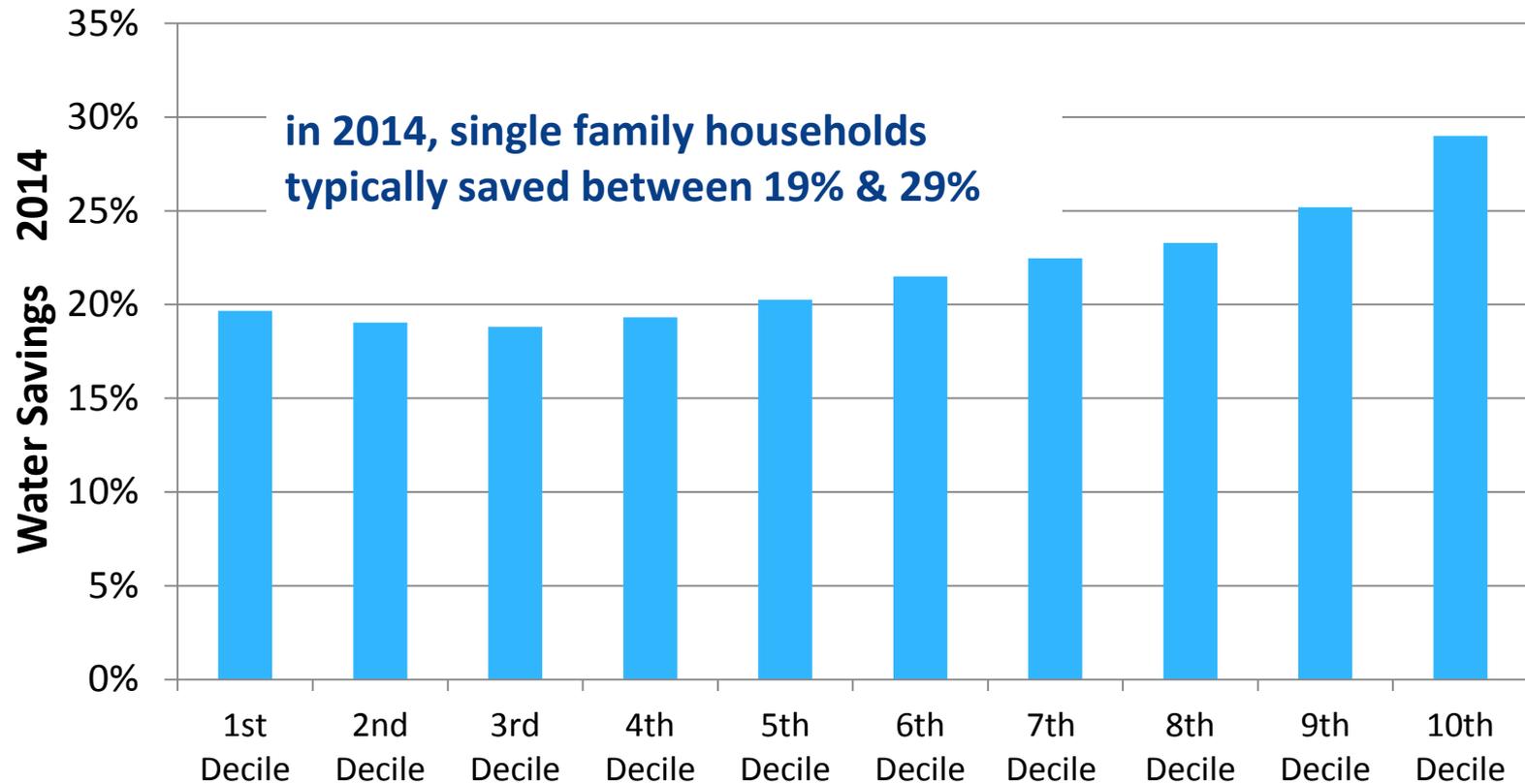
# Our Community is Committed to Making Conservation Work, Especially During Droughts

**94% compliance rate** for 2014 rationing

Residents surveyed in October:

- 78% had done (almost) as much as they could to conserve water
- on average, willing to live with Stage 3 rationing 4 or more years out of the next 10 years
- 82% are willing to continue most conservation steps after the drought ends

# 2014 Savings During Drought



lowest 10% of accounts



highest 10%

32 GPD



86 GPD



294 GPD



# Why Focus on the Peak?

- Make existing supply **go further** during drought
  - cost-effective measures
  - ease of installation and use
- Water **reliability**

the water we conserve today is the cushion we keep in Loch Lomond in case the drought continues



# Ongoing Effects of Rate Increases

- households respond to rate increases by saving water
- current study – how strong is the Santa Cruz response?
- typical response elsewhere is to cut use 2-4% for a 10% rate increase
  - 50-100 MG among Santa Cruz households?
- increased participation in new and ongoing City conservation measures



# More Opportunities Where Large Savings Have Been Proven Possible

- **Base Use**
  - Dish Prewash in restaurants
  - High-Efficiency Laundries
- **Peak Use**
  - Resilient Landscapes
- **Peak and Base Use**
  - Home Water Reports
  - Laundry to Landscape

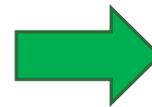
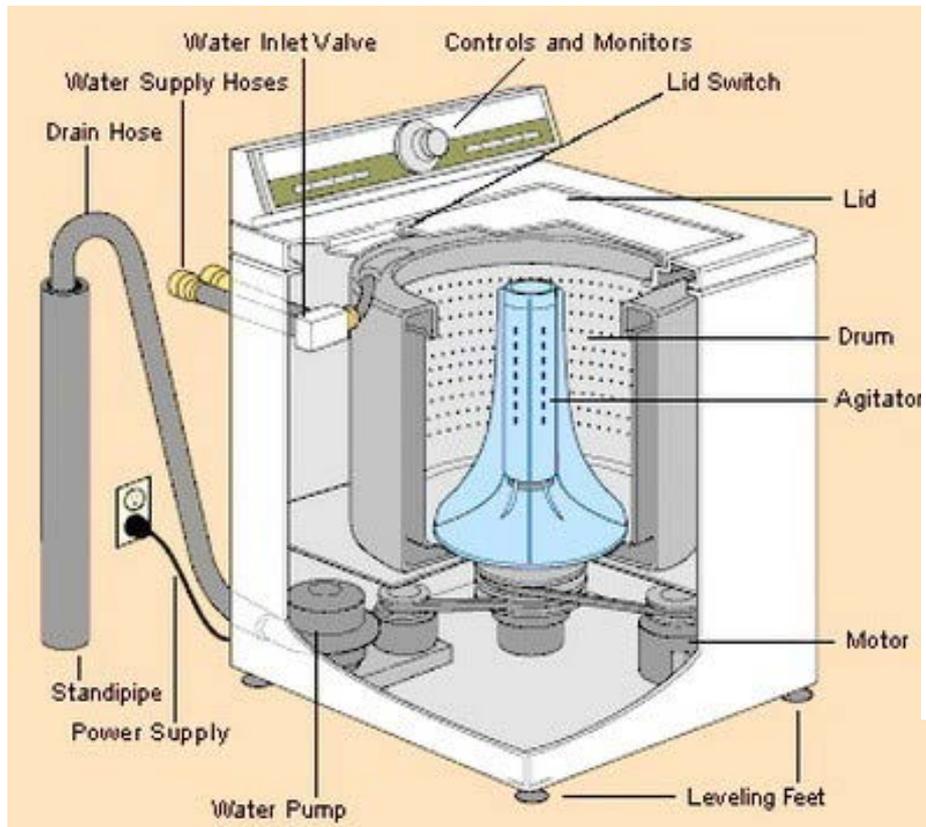
# There's Still Potential for Indoor Year-Round Savings

## Proportion of Fixtures that are Water-Efficient

	Single Family Homes	Multi-Family Homes	Businesses
Toilets $\leq 1.6$ gpf	90%	89%	96%
1.28 gpf	7%	3%	14%
Washing Machines $\leq 30$ gpl, now 12 gpl	63%	58% (in the home) 46% (in laundry rooms)	52%
Showers	92%	95%	95%
Faucets	83%	87%	4%-88% (depending on type of faucet)

# Household Laundry

## Older vs. High Efficiency Clothes Washers



# High Efficiency Clothes Washers

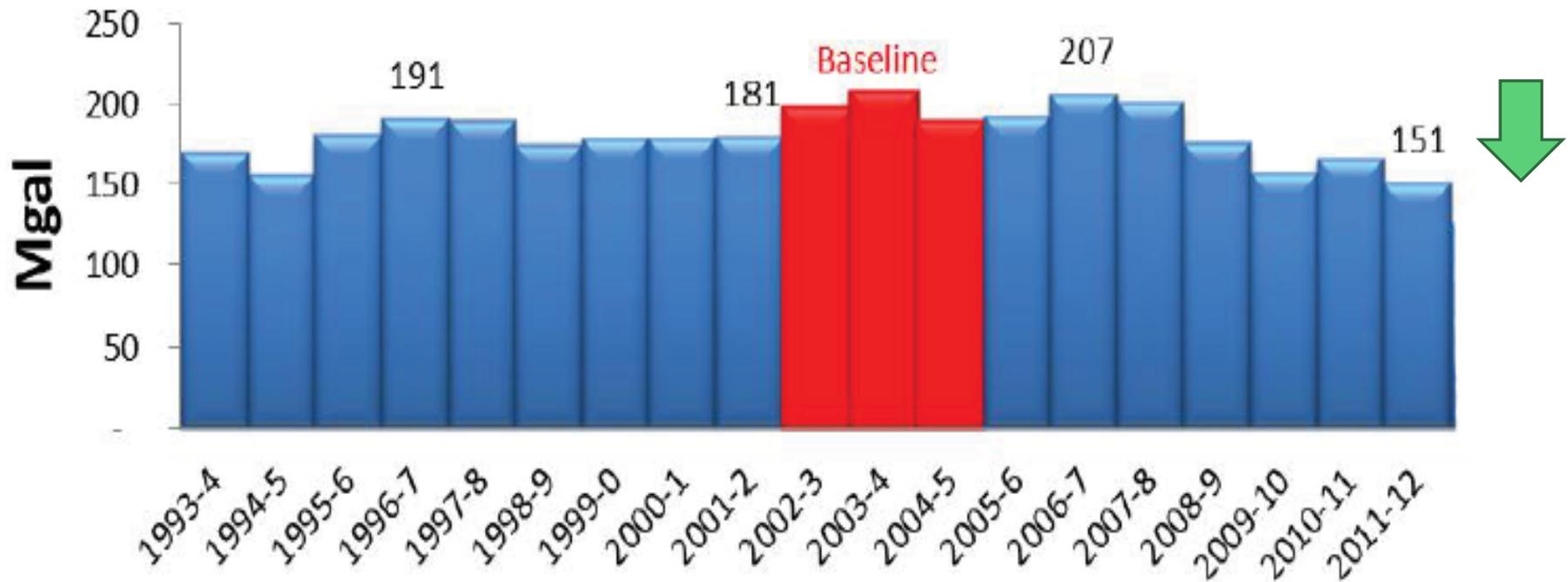
- **2015 rebates**
  - \$100 from the City
  - \$50 from PG&E
  - covers the cost difference of a HE washer
- from 30-40 gallons to 12 gallons/load, save 60-70%
- at 50 loads a year, save up to 1400 gals (2 units) a year per person
- save on energy for water heating and clothes drying, too

# Potential Savings in Business & Institutional Water Use



# UCSC Water Use

## Main Campus Annual Water Use



the university cut its water use 56 MG (27%) from 2007 to 2012

# UCSC Water Savings

- **installed submeters**
  - site-specific water use
  - identify potential savings
- **reduced irrigation use by half**
- **new buildings will be plumbed for grey water**

# Pre-Rinse Spray Valves



- **119 restaurant accounts**
- **audits showed 87% of spray valves inefficient**
- **City and Ecology Action installed 206 new valves (0.65-1.28 gpm)**
- **average yearly savings 38,000 gal/valve/year**
- **total savings 7.9 MGY**

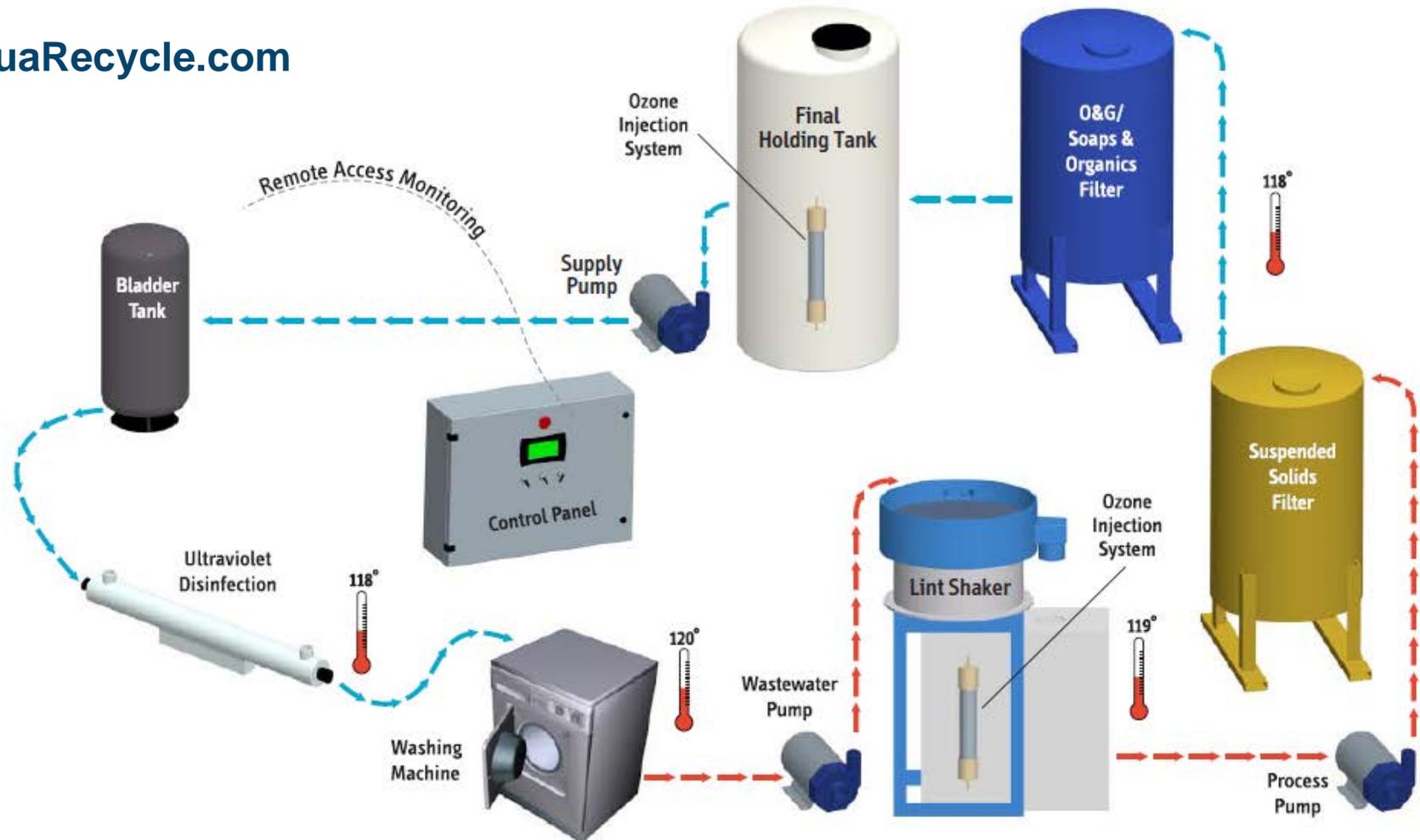
# Hotel & Commercial Laundry Water Reuse



**68 hotels, 12 laundromats**

# How Laundry Water Can Be Recycled

AquaRecycle.com



# Recycled Laundry Water – Documented Savings

- adopted by hotels, medical and correctional facilities
  - want a greener footprint and lower costs
- EPA study – Grand Hyatt, Seattle, 457 rooms
  - \$100,000 retrofit cost
  - saved \$134,000 in first year, 0.37 MGY
    - \* saved 38 GPD per occupied room
    - 80% less water, 50% less heat
  - installer provides monitoring system, daily reports



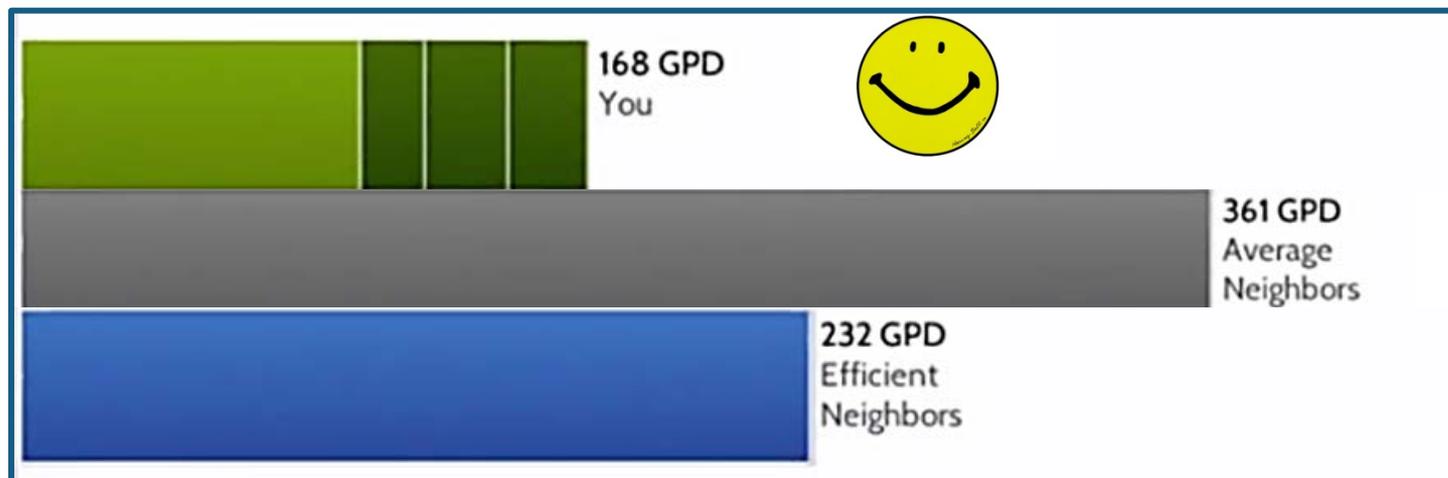
# Commercial & Institutional Users – Water Efficiency Practices

- **how much can be saved at what cost?**
- **what kinds of programs will encourage efficient water practices?**
  - **Green Business program – social recognition**
  - **rate differences for those who meet the efficient water practices?**
- **what measures can make water-neutral growth possible?**

# Home Water Reports

## Who Wants to be the Biggest Loser?

- social comparisons to help customers learn about their water use, cut back on previously unrecognized waste
- personalized recommendations for additional savings
- widely used in CA cities



# Home Water Reports – Energize Savings

- **help reduce and stabilize demand**
- **enhanced communication with customers, targeted surveys, etc.**
- **can track participation in rebate programs, help assess effectiveness of conservation measures**

“So far you have used 3,800 gallons (5 CCF) in 2015. We estimate you will use 36,000 gallons (48 CCF) by the end of the year.”

# Home Water Reports – Proven Savings

- **typically 5% lower demand for single-family residences, within a few months**
  - **equivalent to 50-60 MGY in Santa Cruz**
  - **above average users save twice the percentage of below-average users**
- **low cost** (Soquel Creek 10-07-14 report, single family accounts)
  - **about \$12 per account per year, over 5 years**
  - **\$235-500/ MGY**

# Outdoor Savings – Resilient Landscapes

- Monterey Bay-friendly
- little dry-season water needed
- no fertilizer needed
- reduced runoff, better infiltration





# Our Residential Turf – October Survey

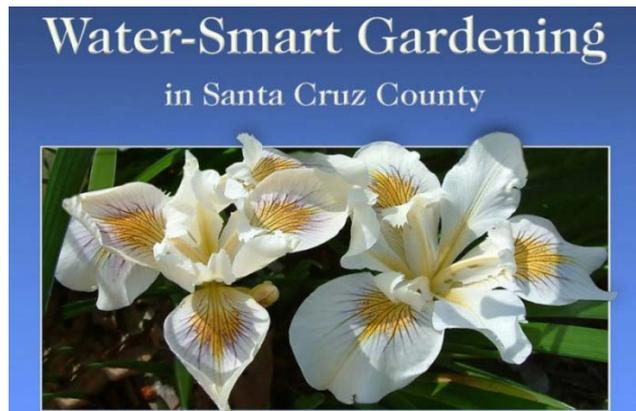
- **23% of local households never had lawns**
- **37% have replaced their lawns**
- **40% still have lawns**

# Create your own resilient landscape

**City offers:**

- rebates for turf removal, weather-sensitive irrigation

**Resources to create a more resilient landscape:**

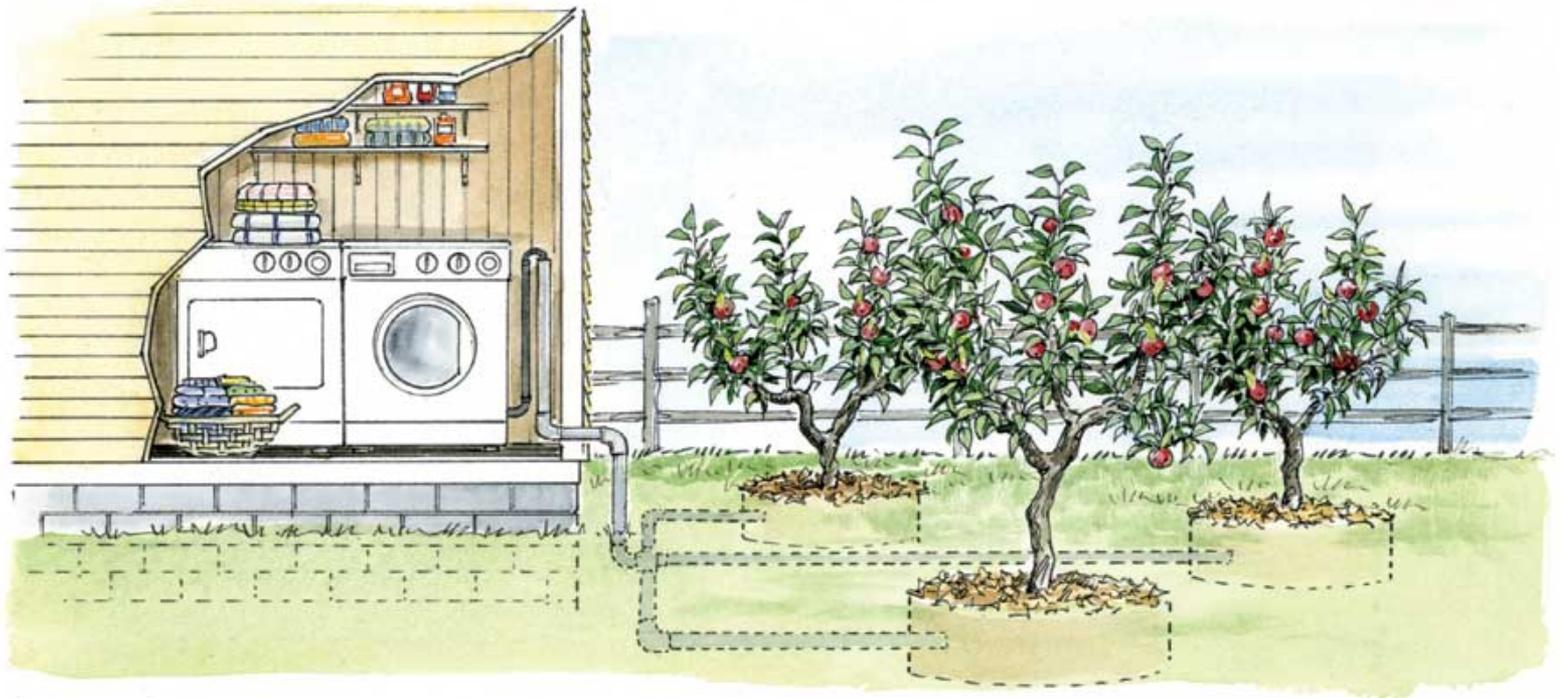


**Check out their garden galleries, tips and find local landscapers to help with your design.**

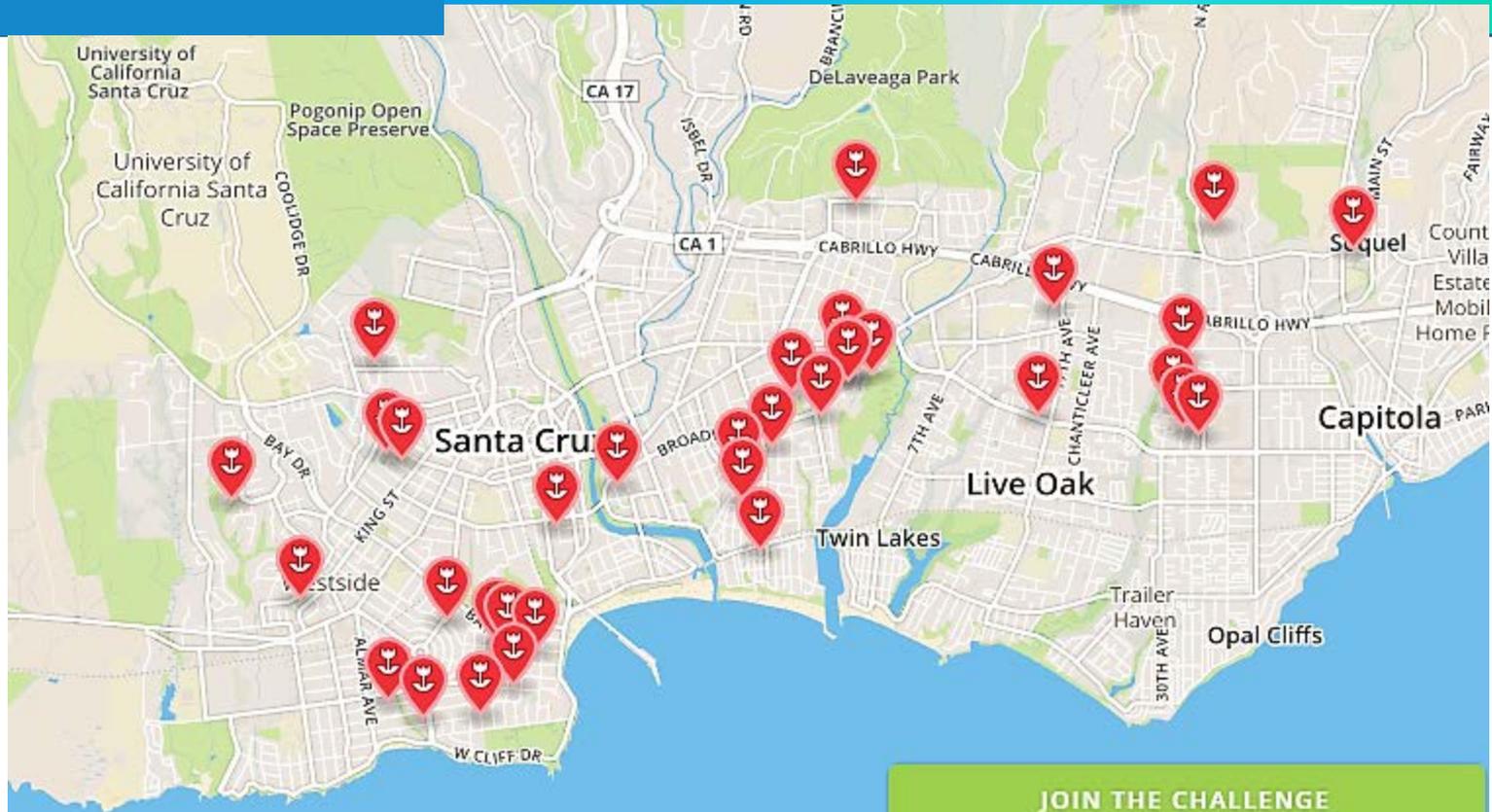
# Start small...or go **BIG!**

- **Transfer part or all of your lawn to low water plants.**
- **Convert spray irrigation to drip-saves 50-75%, especially on shrubs**
- **Consider a greywater system**

# How Grey Water Systems Work



# Central Coast GREYWATER ALLIANCE



Over a half-million gallons of water saved every year from now on!

JOIN THE CHALLENGE

**1000** GREYWATER  
SYSTEM  
CHALLENGE

GET ON THE MAP

# Conservation Measure Potentials

Initiative	Cost	Annual Water Saved
Large-scale Laundry Water Reuse	net savings	1.4 MGY per 100 occupied rooms
Pre-Rinse Spray Valves	\$240/MG	8 MGY
Home Water Reports at 3% less water at 5% less water	\$600/MG \$235-500/MG (Soquel)	40 MGY 50-60 MGY
HE Clothes Washers (at 50% less water)	\$2100/MG	48 MGY
HECW in common areas	\$3100/MG	3 MGY
Laundry to Landscape (at 10% less irrigation)	\$8200/MG	0.4 MGY from 500 homes
Turf Replacement (at 25% less irrigation)	\$18,000/MG with \$1/SF rebate	0.4 MGY per 1000 homes

# Your Personal Potentials

Initiative	Cost	Annual Water Saved
HE Clothes Washers (at 50% less water, 4 loads a week)	\$150 extra for HE	<ul style="list-style-type: none"><li>• 4 units per couple</li><li>• \$25-\$100/year in Tier 3 or higher</li><li>• paid off in 2-4 years</li></ul>
Turf Replacement	\$3/sq ft	<ul style="list-style-type: none"><li>• at \$25 per unit (penalty rate)</li><li>• paid off in 5 years</li></ul>

# Infiltrate Our Rainwater



# Aquifer Recharge

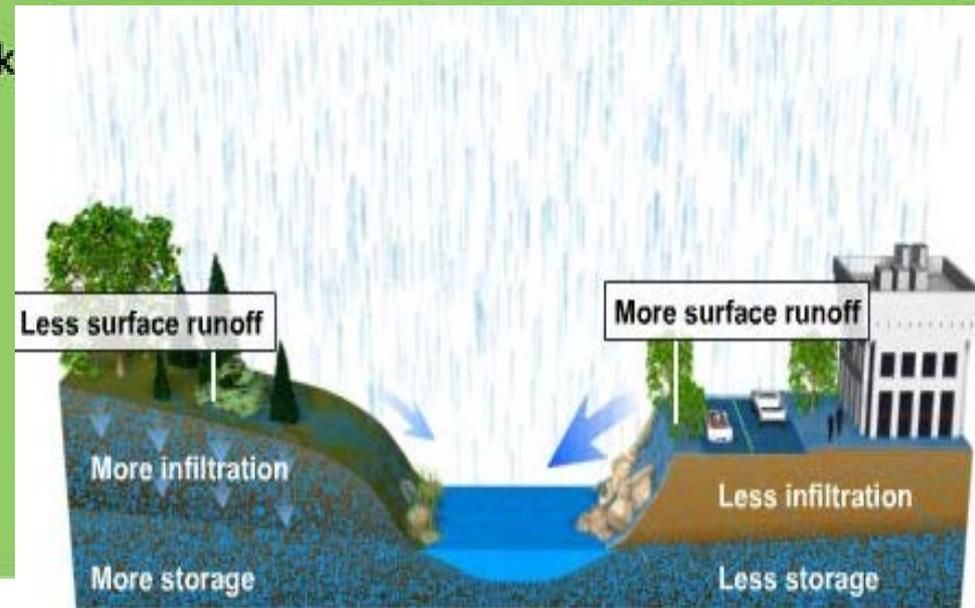
## Aquifer Recharge Begins At Home Maximizing Rainwater Infiltration in Our Landscapes

Tuesday, May 26th 7-8:30pm  
Simpkins Swim Center, 979 17th Ave.

**Emily Corwin, P.E.**, will present the Fall Creek Engineering study of rainwater infiltration potential in Live Oak, Santa Cruz, Scotts Valley, Soquel, Aptos

**Mike Cloud**, geologist and hydrologist will describe the aquifers beneath our feet.

**Sherry Bryan**, Ecology Action, will describe how to modify our landscapes to maximize rainwater infiltration.



# What's Next?

- **For the Water Department:**
  - 2015 Water rationing
  - Water loss control project
- **For the Water Supply Advisory Committee**
  - Next meetings June 11, 12 (Location)

# Contact Information

- **Staff**
- **WSAC**

Thank You

