



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:

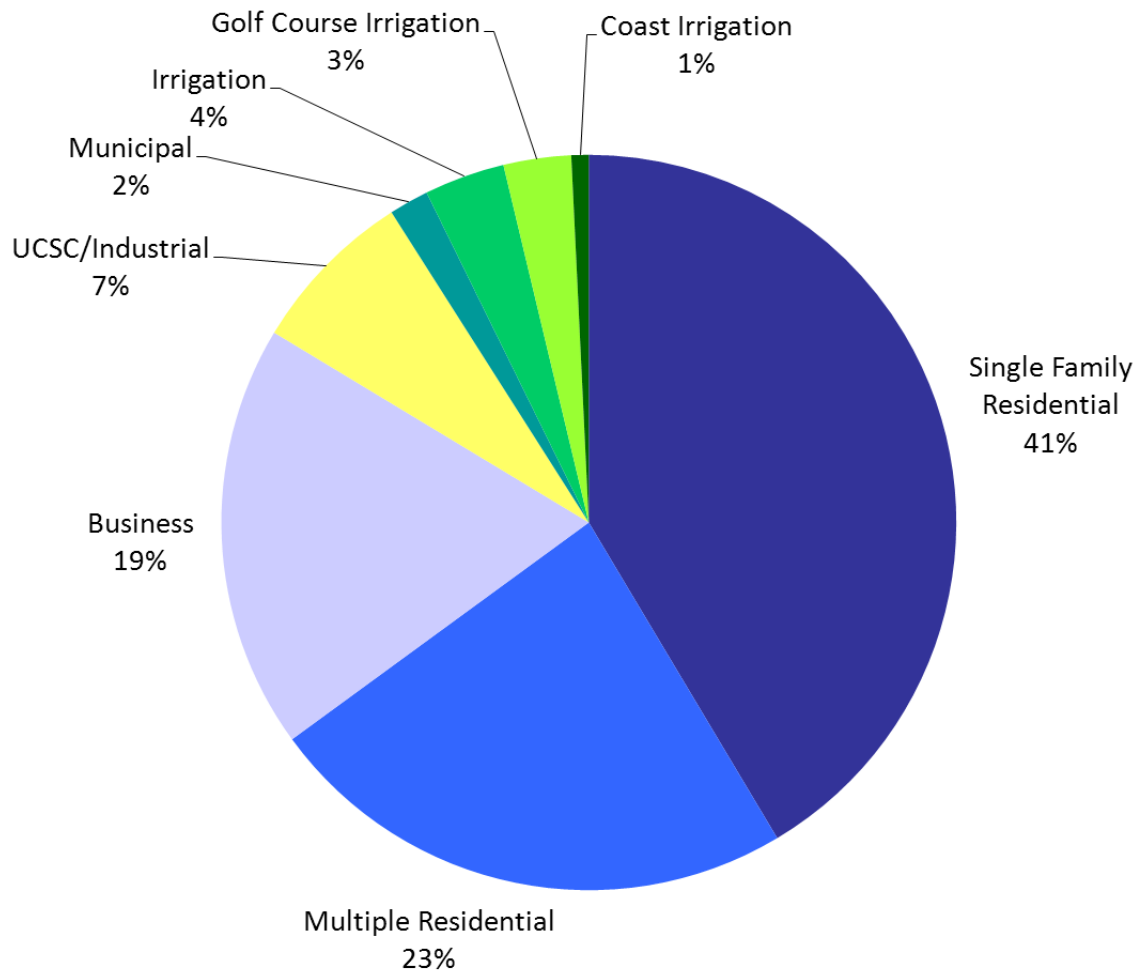
- 95,000

Governing body:

- City Council



Water Use by Customer Category



Water Conservation Office

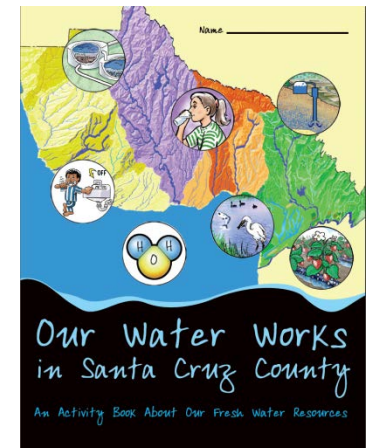
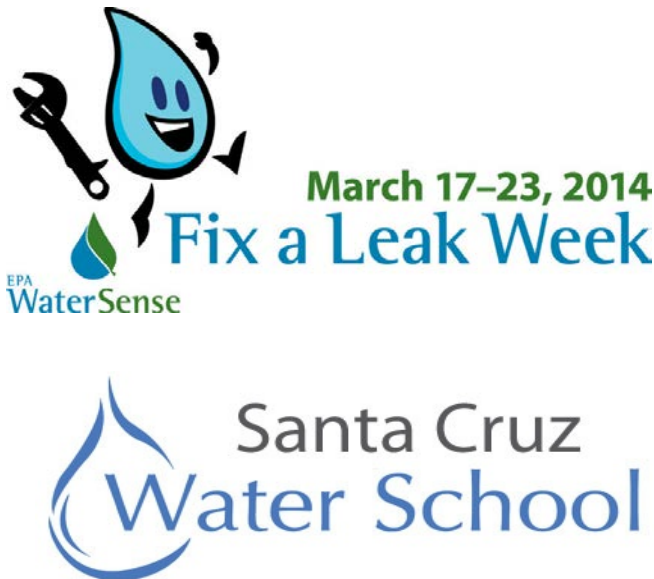
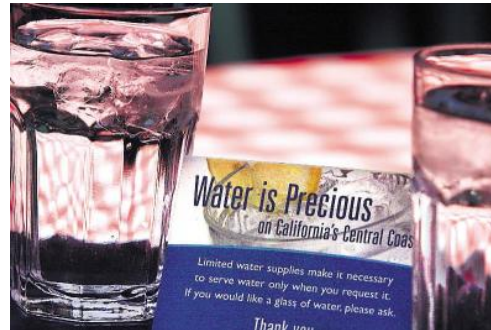
Primary responsibility: develop and implement programs that reduce customer demand for water and increase water use efficiency.

- 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

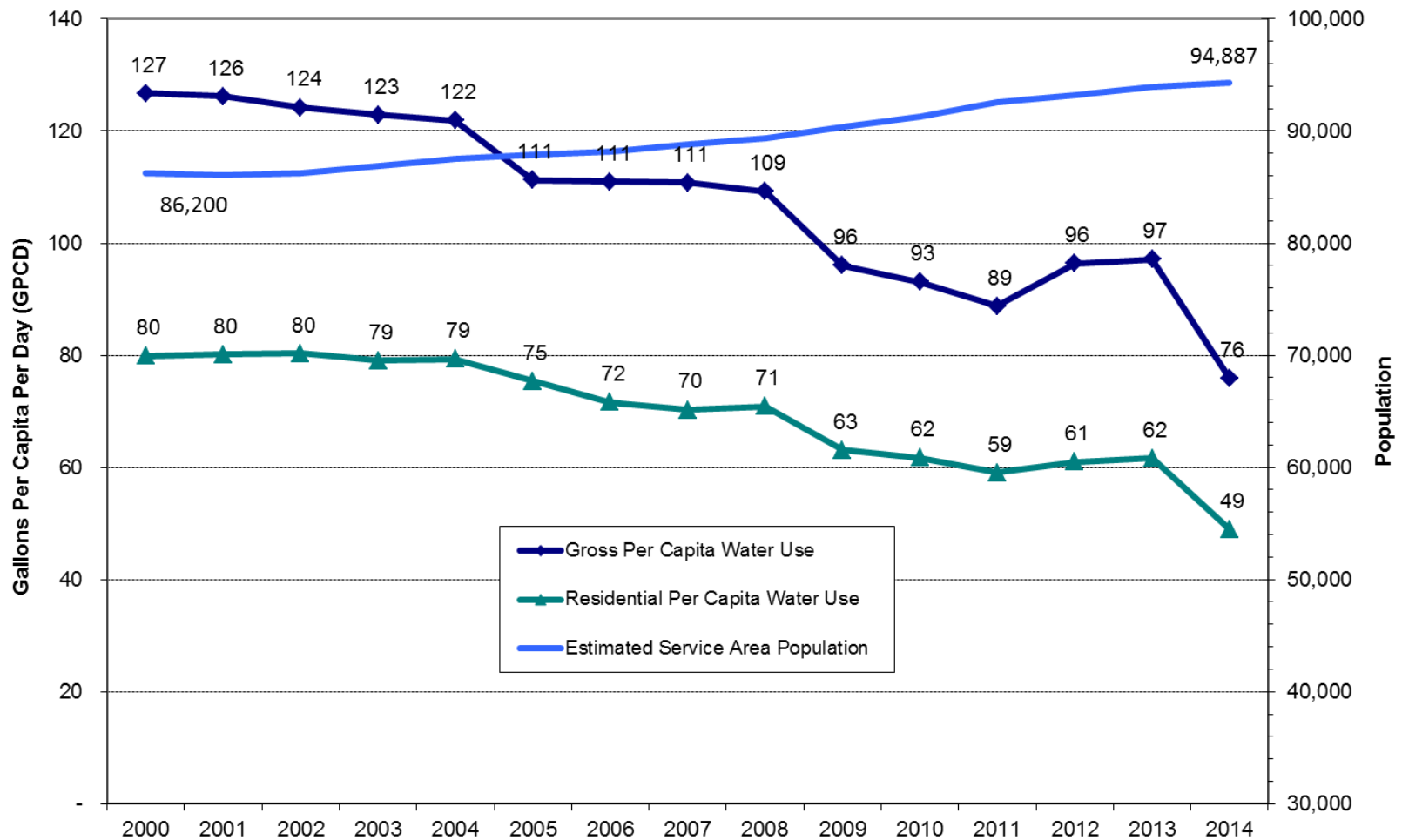


Water Demand Monitoring Program

- 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



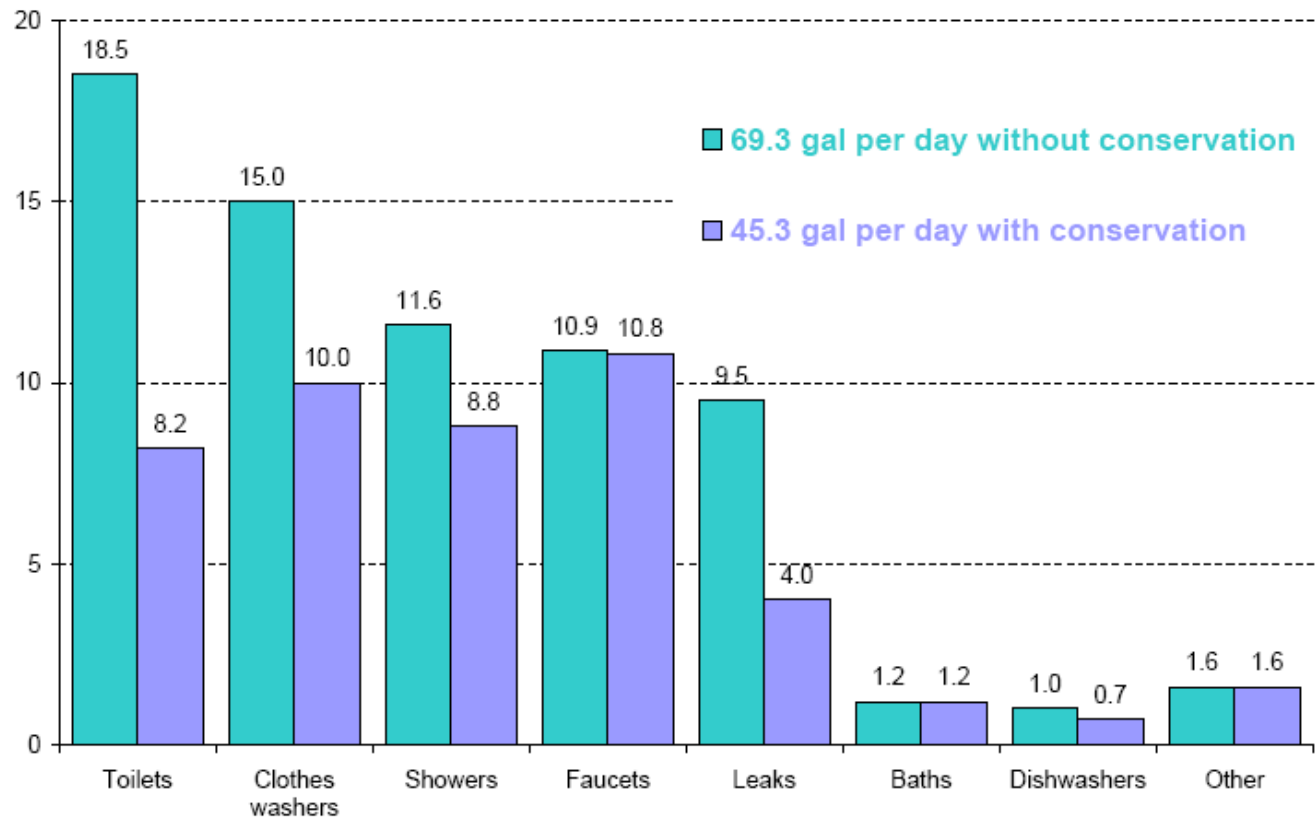
Long-Term Water Conservation Programs

- 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

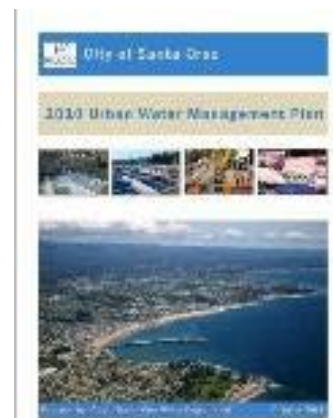
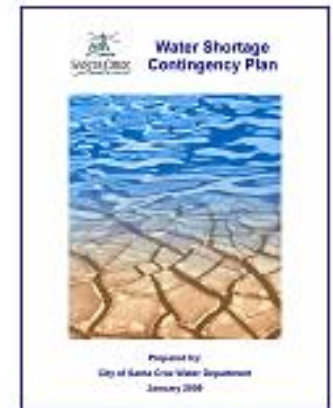


Residential indoor water use (gallons/person/day):

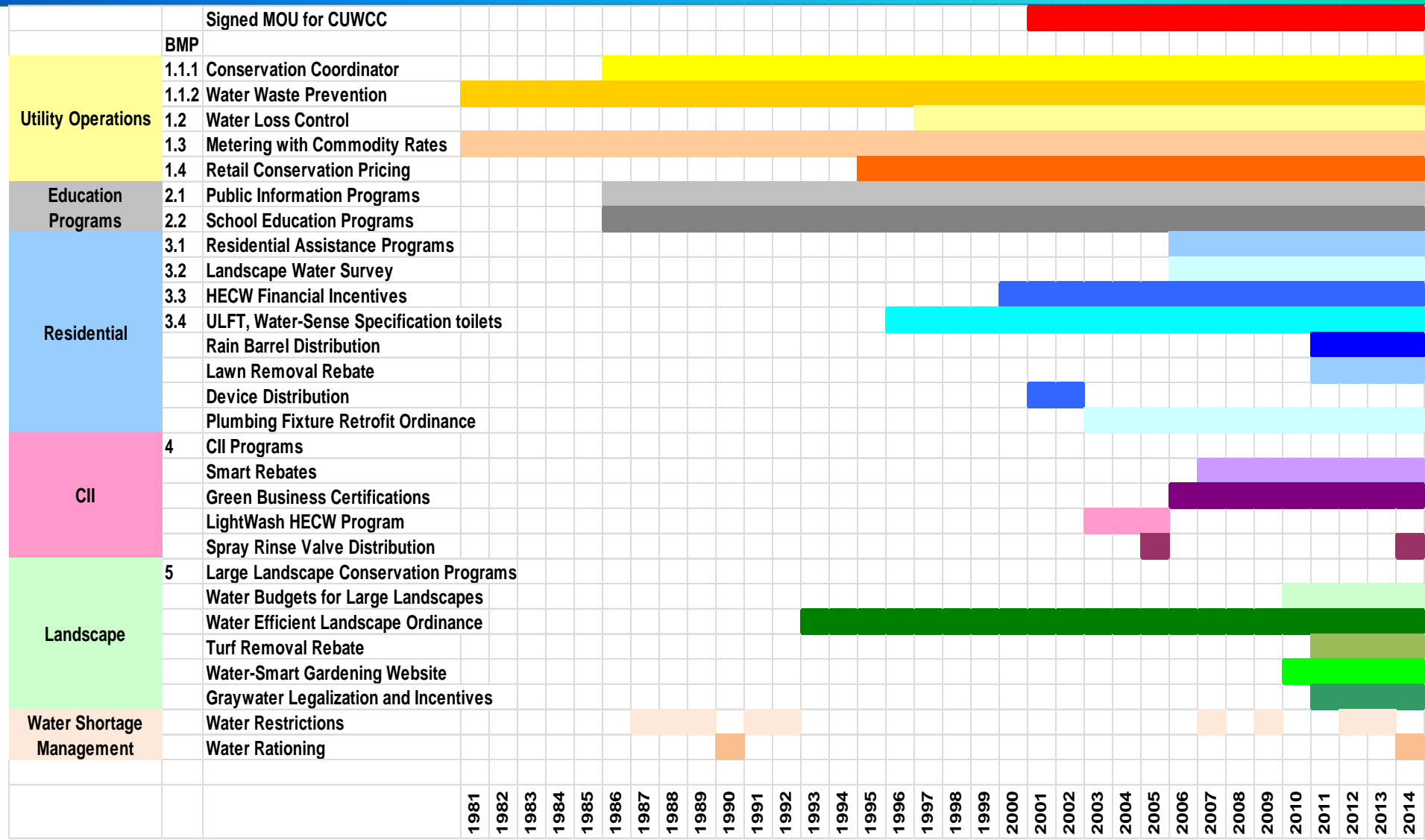


Planning and Analysis

- 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



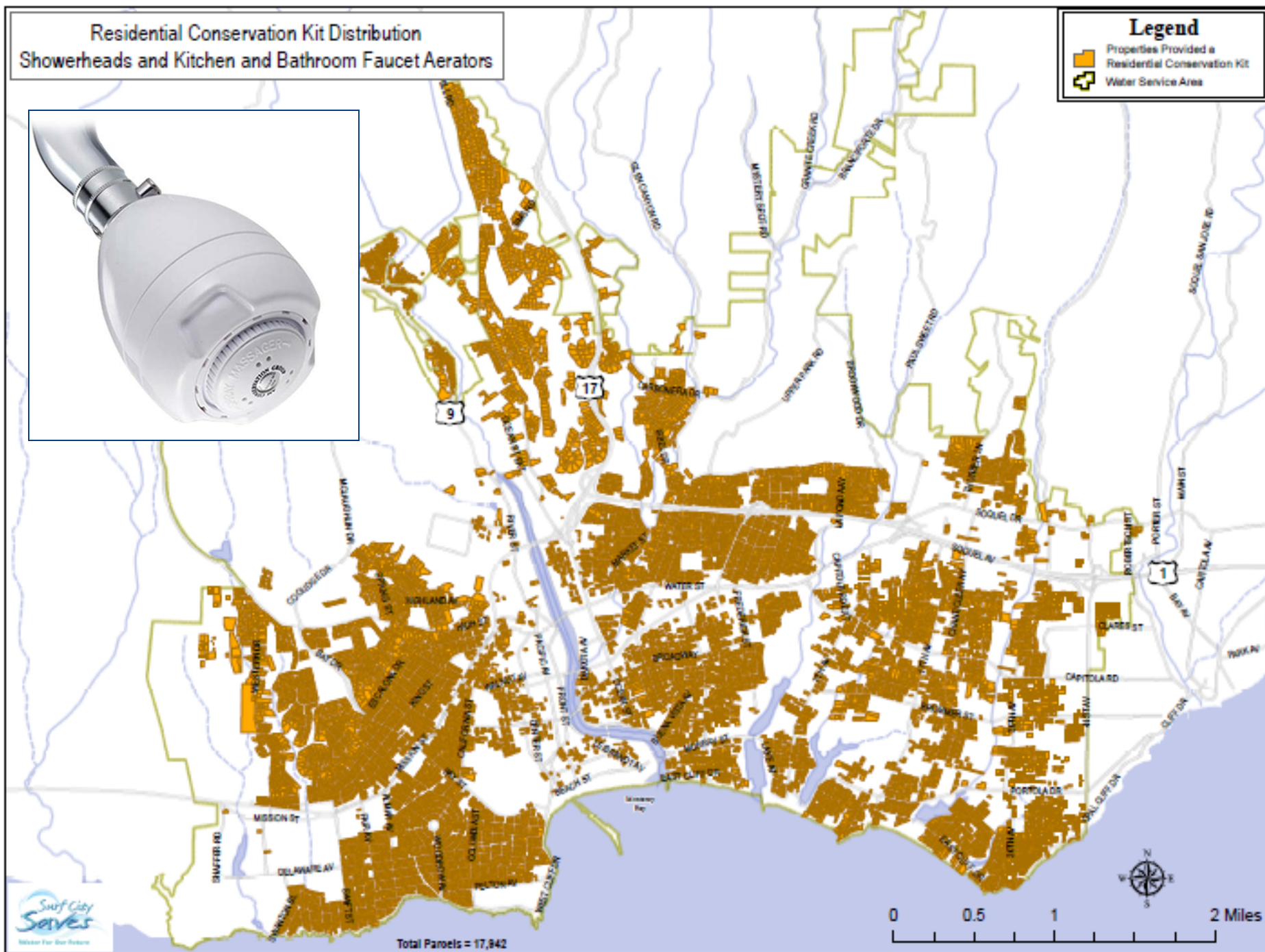
Water Conservation Program Timeline



Residential Conservation Kit Distribution Showerheads and Kitchen and Bathroom Faucet Aerators

Legend




- Properties Provided a Residential Conservation Kit
- Water Service Area

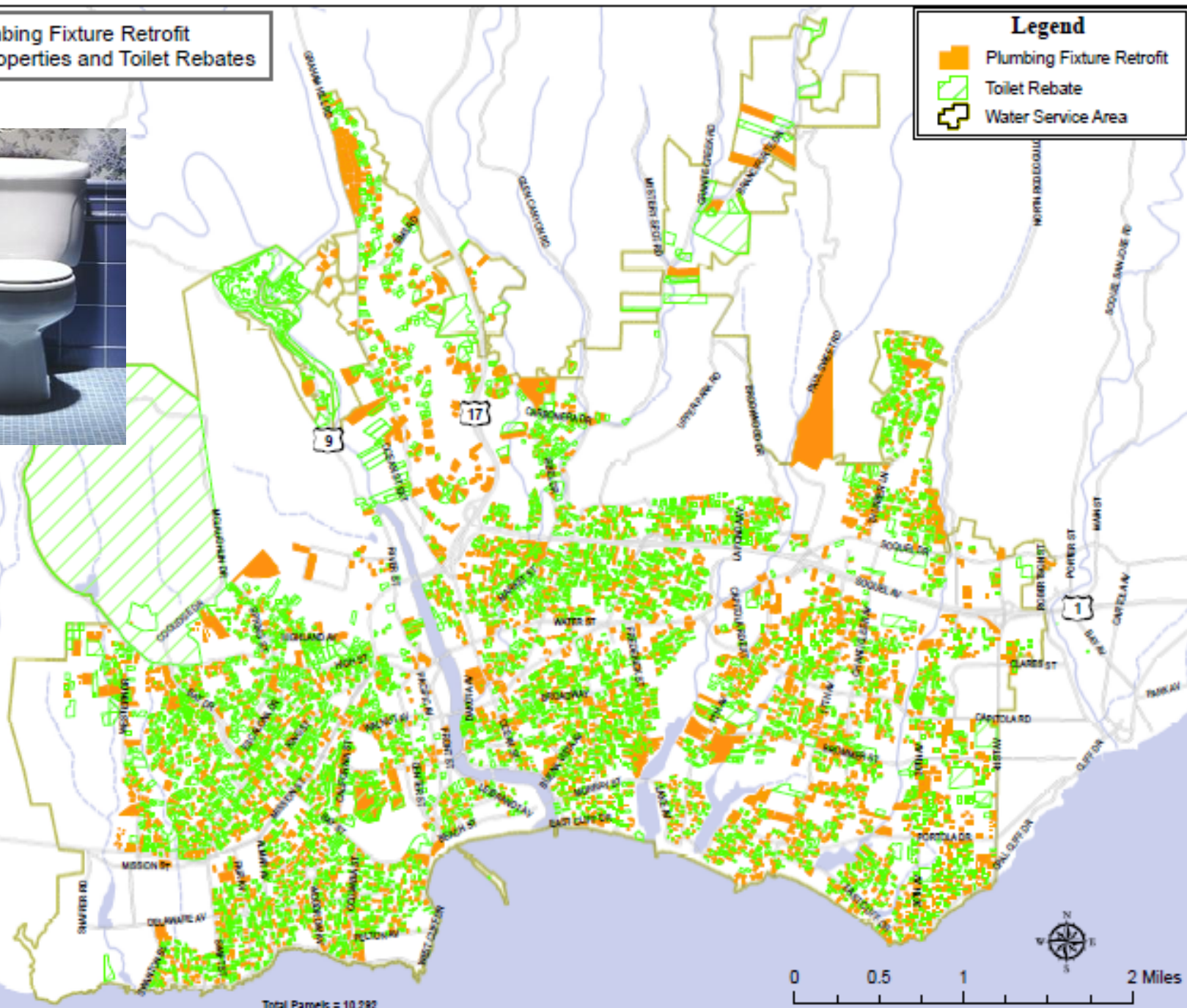


Plumbing Fixture Retrofit
Certified Properties and Toilet Rebates



Legend

-  Plumbing Fixture Retrofit
-  Toilet Rebate
-  Water Service Area

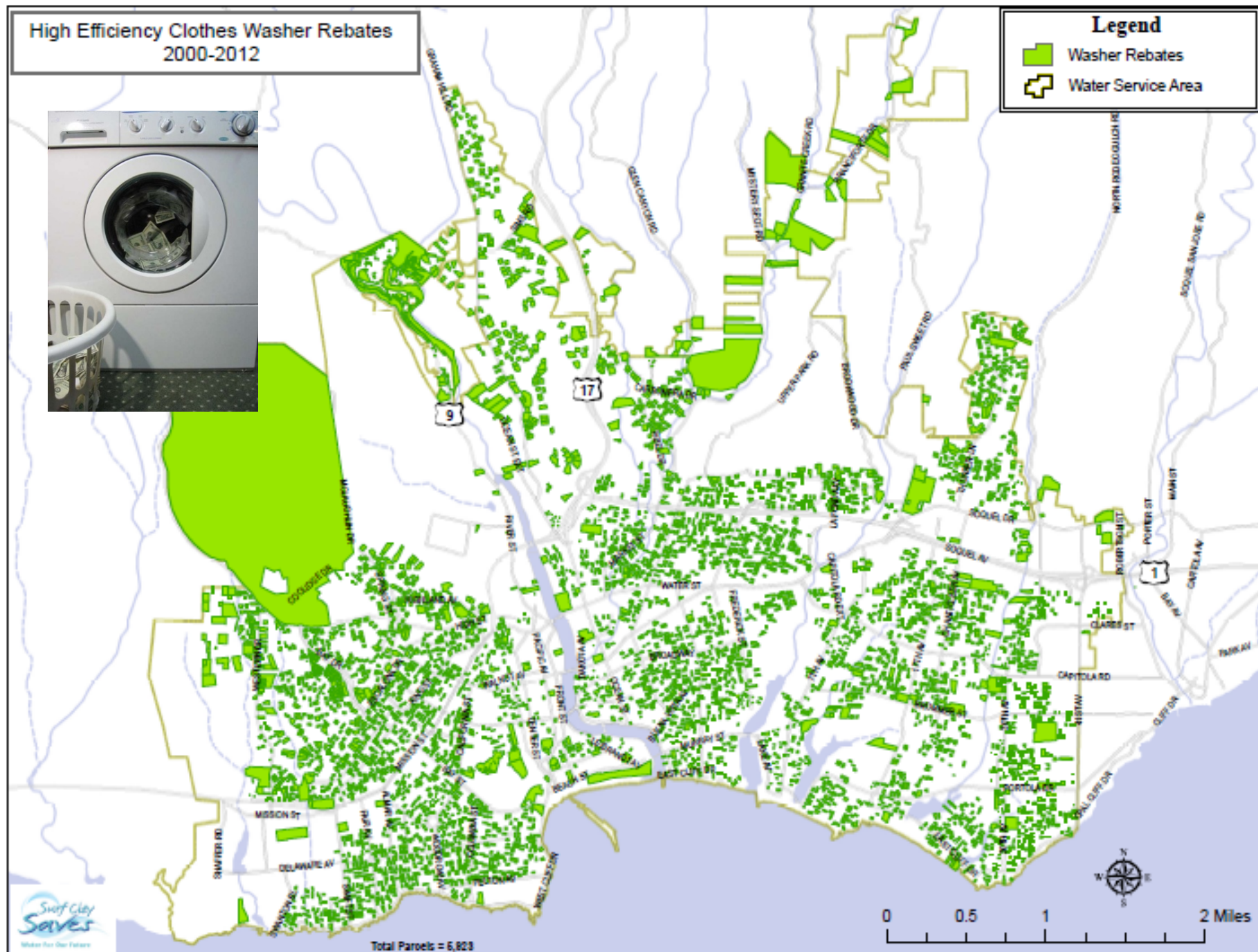


Total Parcels = 10,292

High Efficiency Clothes Washer Rebates 2000-2012



- Legend**
- Washer Rebates
 - Water Service Area



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

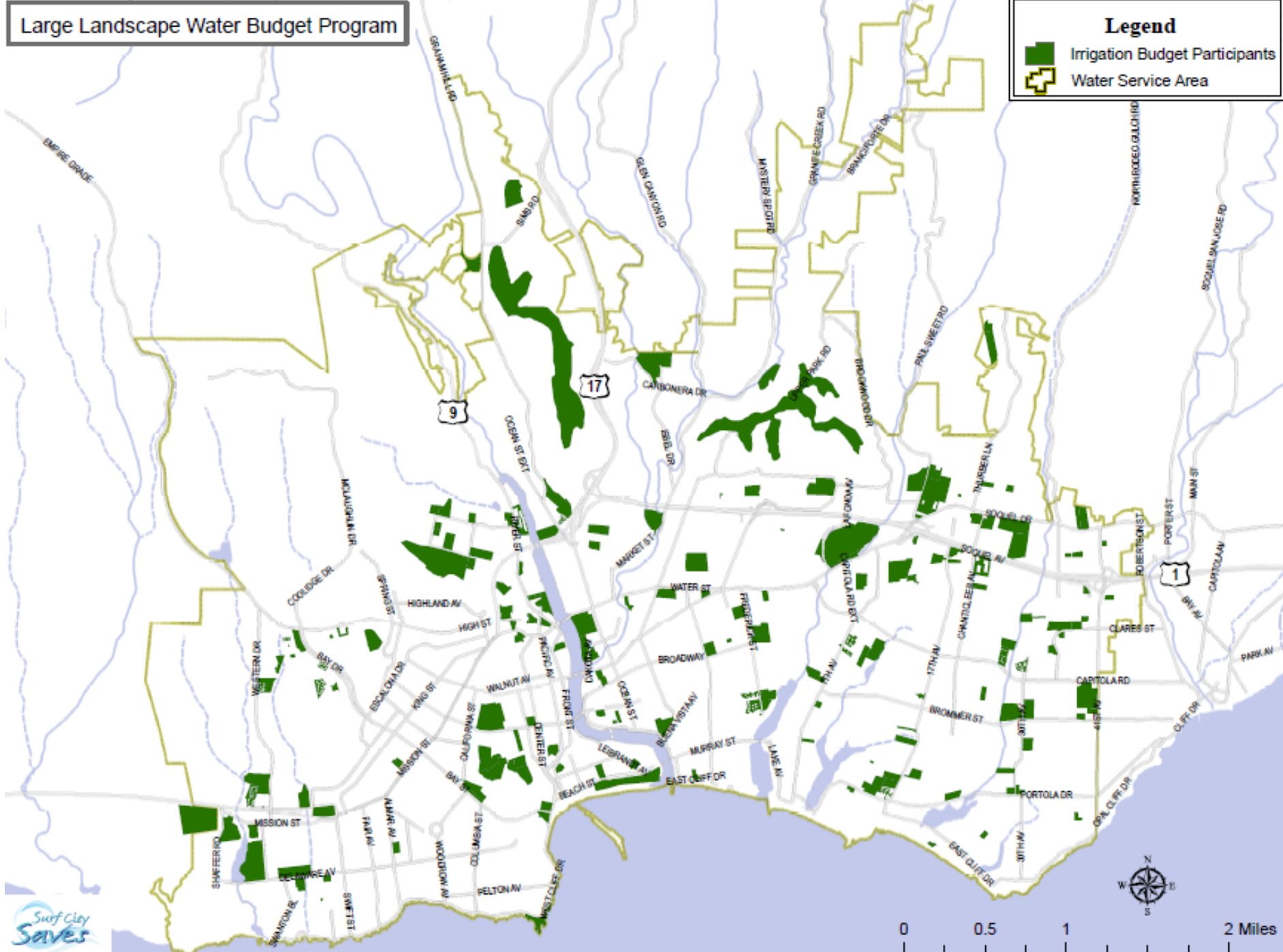
- **Contracted with Waterfluence in June 2010**
 - Primary author of the CUWCC's Guidebook on Large Landscape Conservation Programs
 - Currently working with water agencies across California
- **Early 2010 - changed all large irrigation accounts to monthly billing**



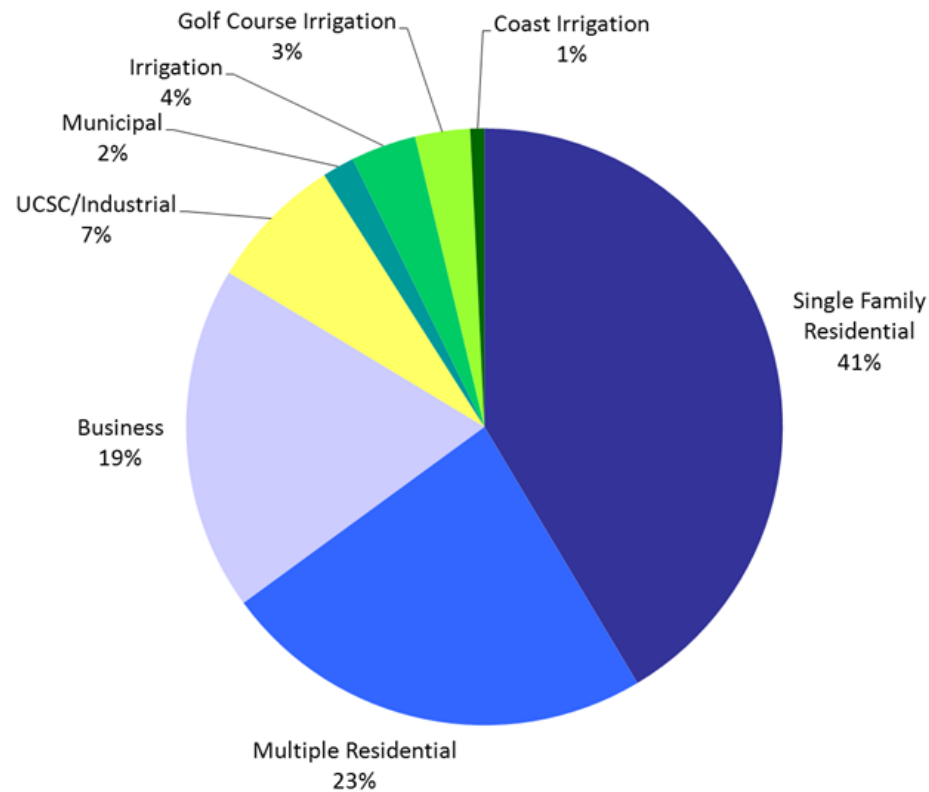
Large Landscape Water Budget Program

Legend

- Irrigation Budget Participants
- Water Service Area



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 Rhodose
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 Ccf/Bill: 0



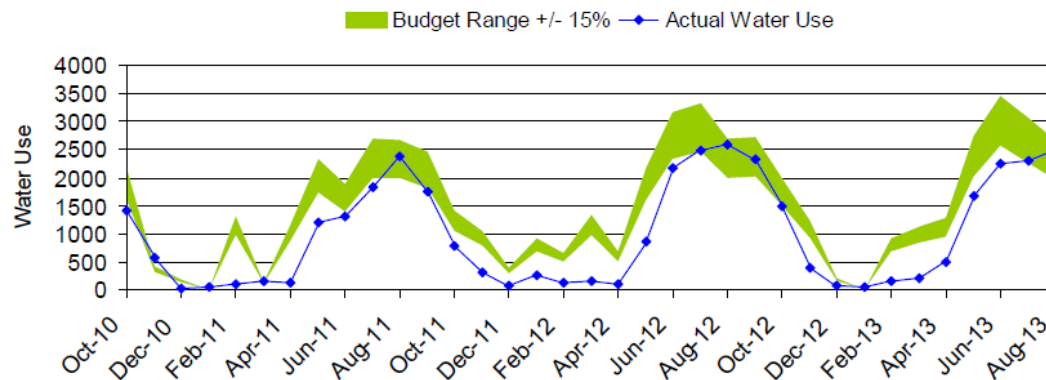
CITY OF SANTA CRUZ
HARVEY WEST PARK
809 CENTER ST RM 101
SANTA CRUZ CA 95060-3826

Site Percentile

90

100=top score

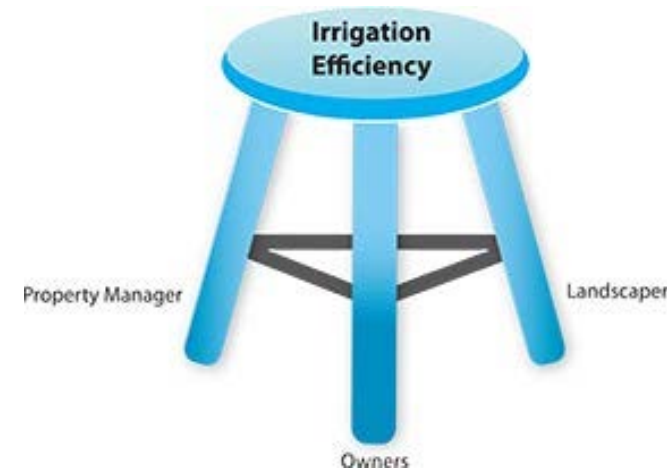
Water Use History



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
Over Water Ccf	157	211	455	825	8/9/2013	2,475	2,318	157	6%	4.64
Over Water %	6%	2%	2%	2%	7/9/2013	2,313	2,653	0	0%	5.31
Dollars Lost \$	\$627	\$843	\$1,818	\$3,301	6/10/2013	2,239	3,008	0	0%	6.02
					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 or call 831-420-5230.



Field Survey Evaluation

Sprinkler Water Runoff



Clogged



Tilted



Misaligned



Sunken

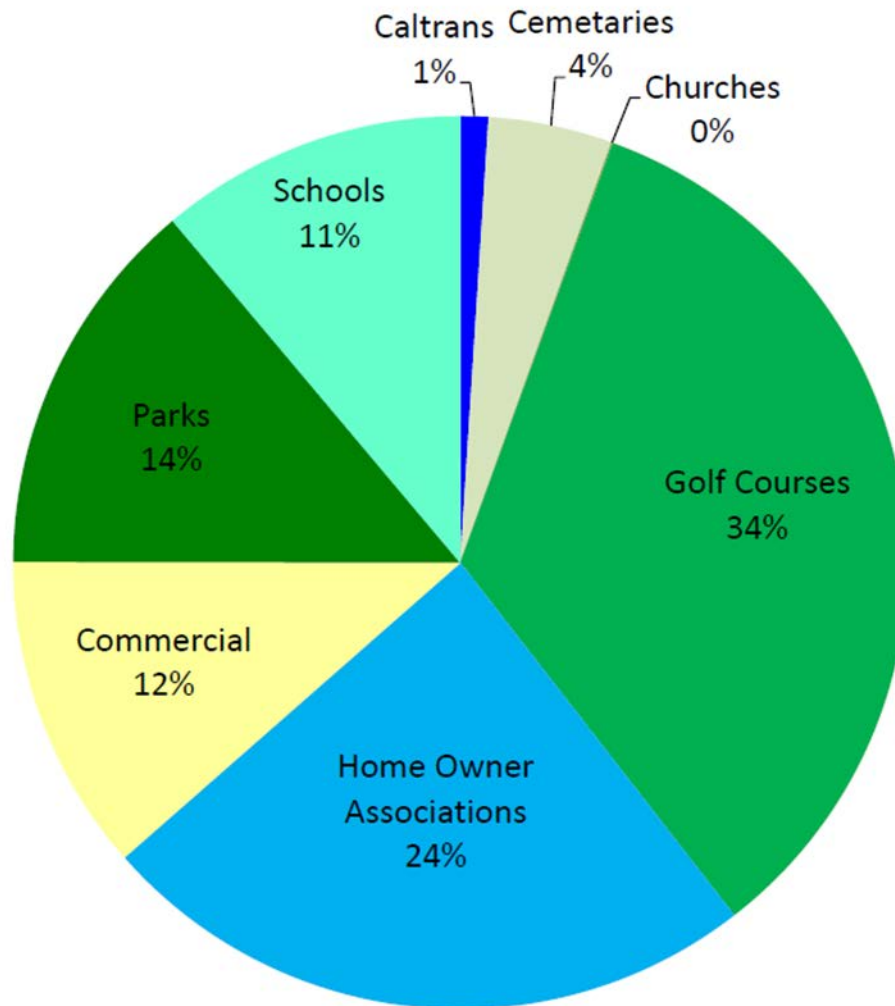


Leak

Large landscape Program Stats

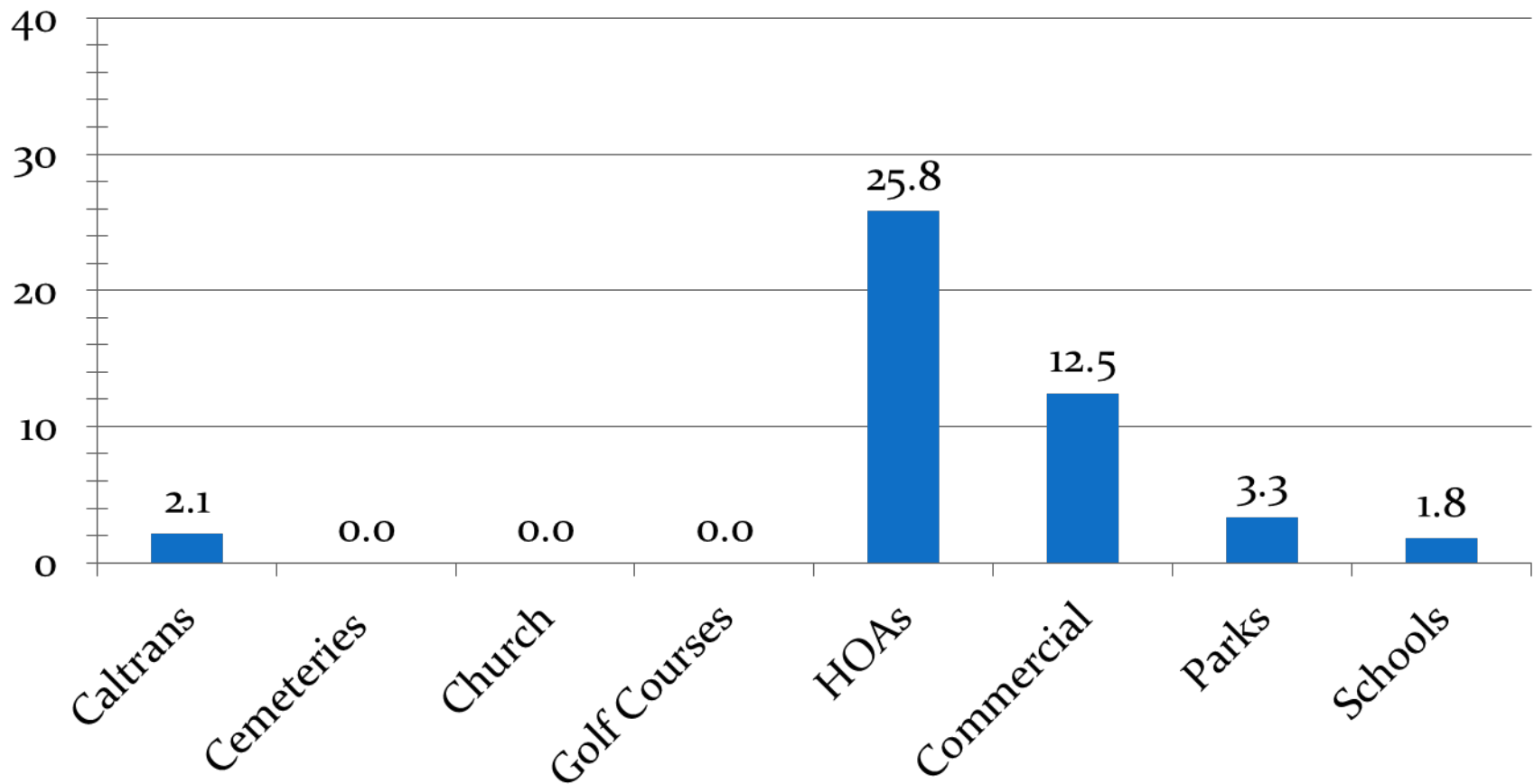
- 187 sites
- 267 water accounts
- 17.7 million square feet of landscaping
- 78 percent turf
- ~ 250 million gallons per year
- Average application rate: 2.0 feet/year

Water Use Breakdown



Where Overwatering Occurs

by volume (million gallons)

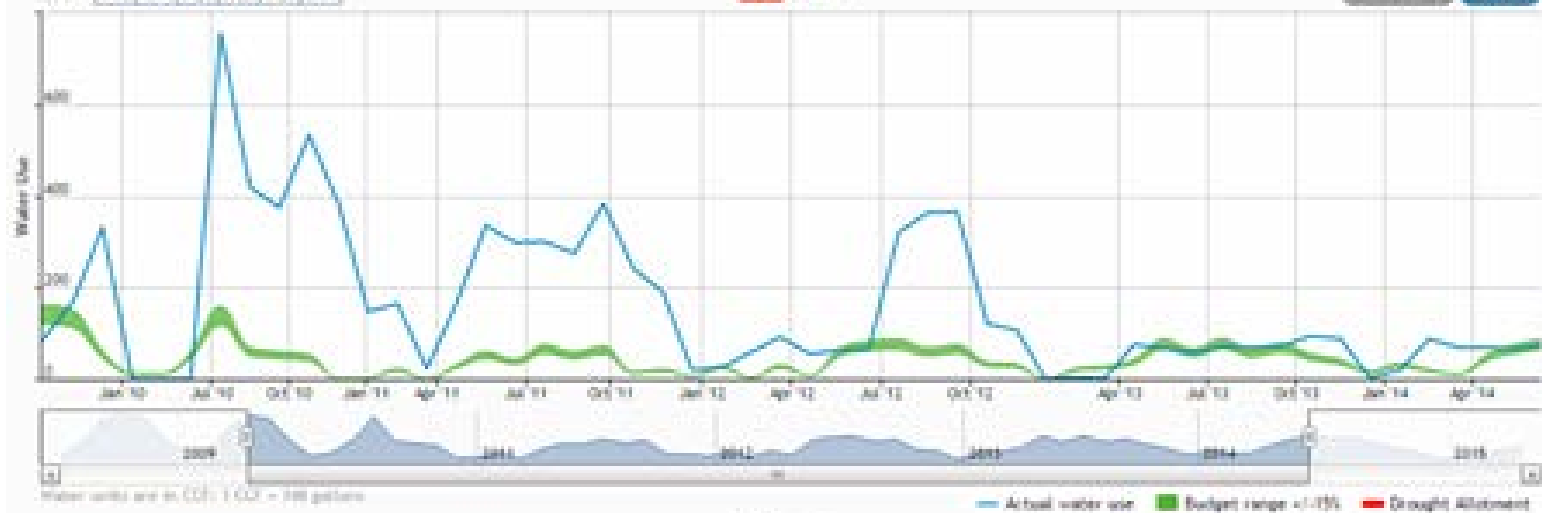


Water Use History

Zoom: 6m YTD 1y 3y 5y All

19 Site Score

Cumulative Normal

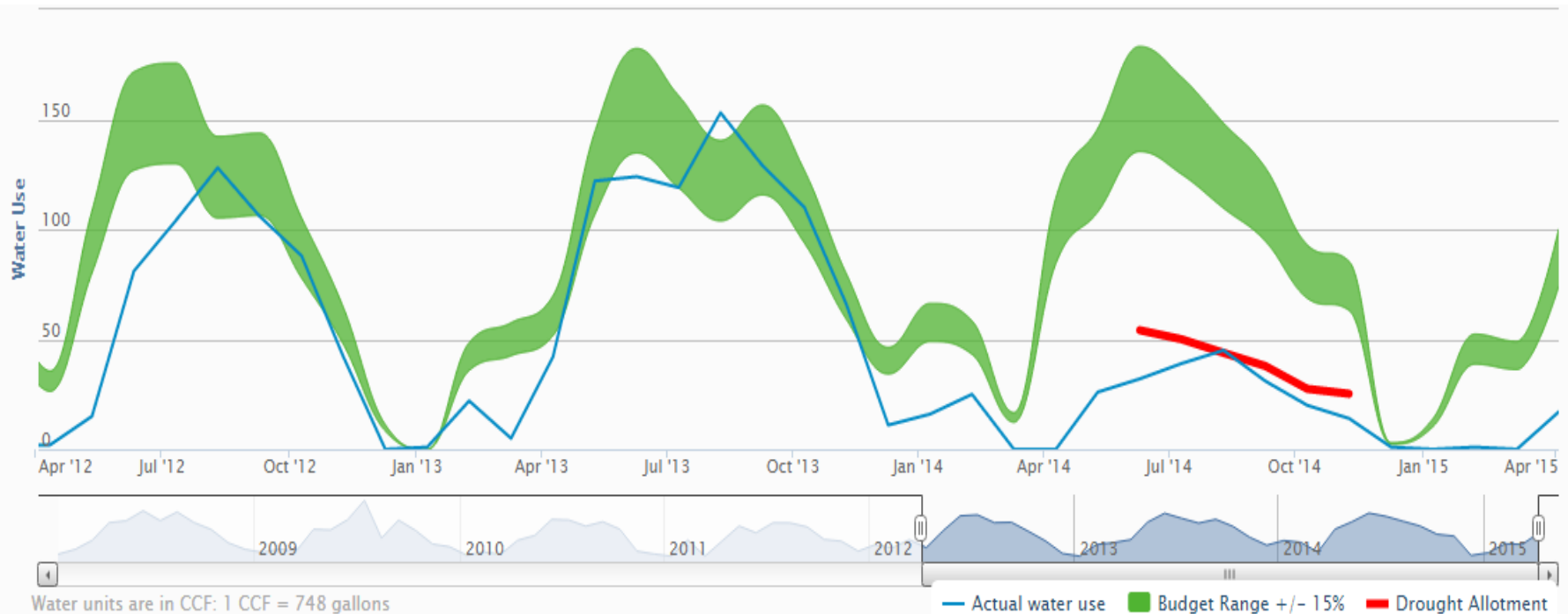


Program Water Savings

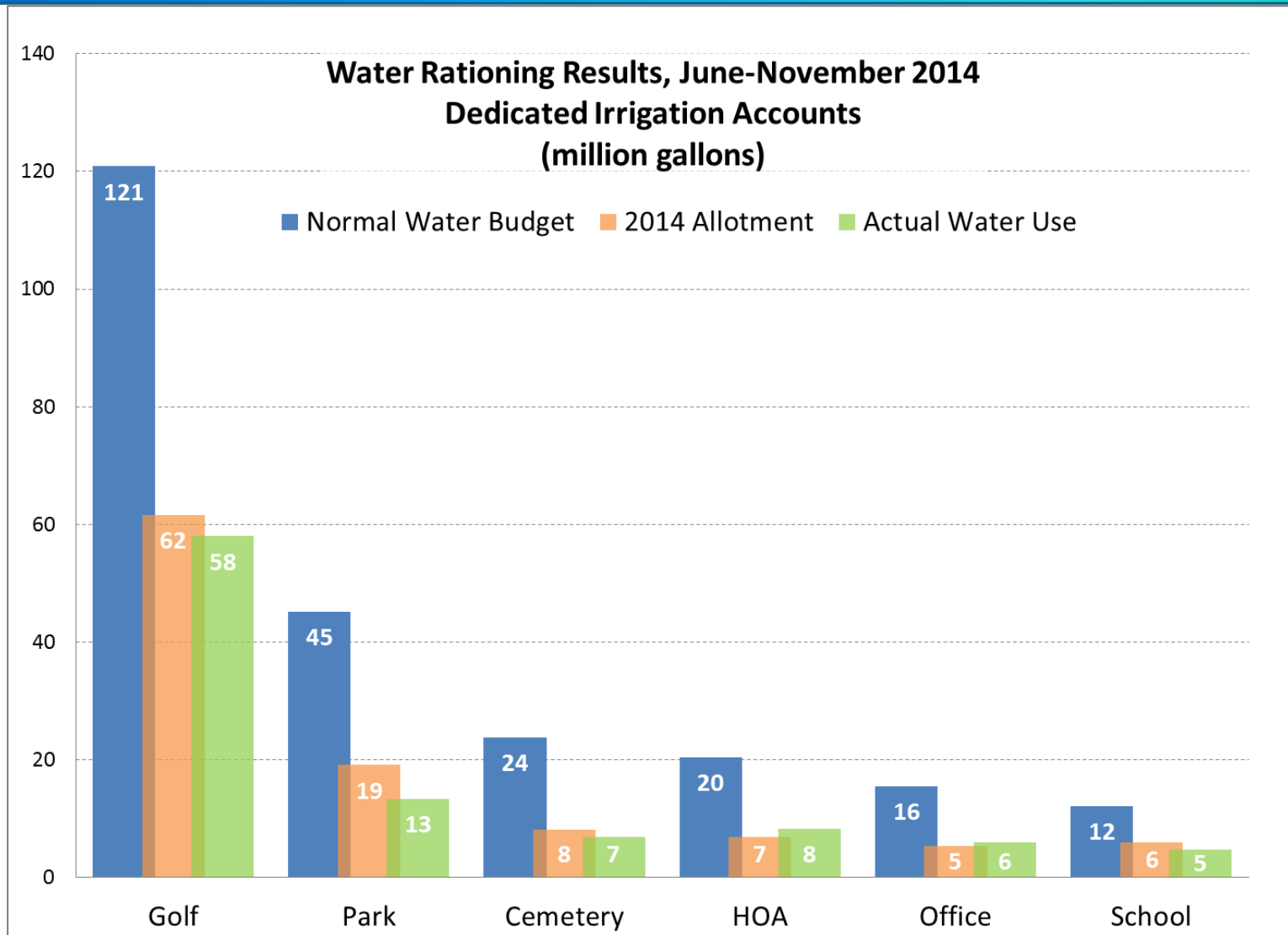
Overwatering	2012	2013	Savings
Feet/year	0.36	0.24	-0.12
Percent	18%	13%	-5%
Volume (mgy)	45.2	30.1	-15.1

Using Water Use Report as a Drought Management Tool

Rationing allotment = $\frac{1}{3}$ of budget



2014 Rationing Results



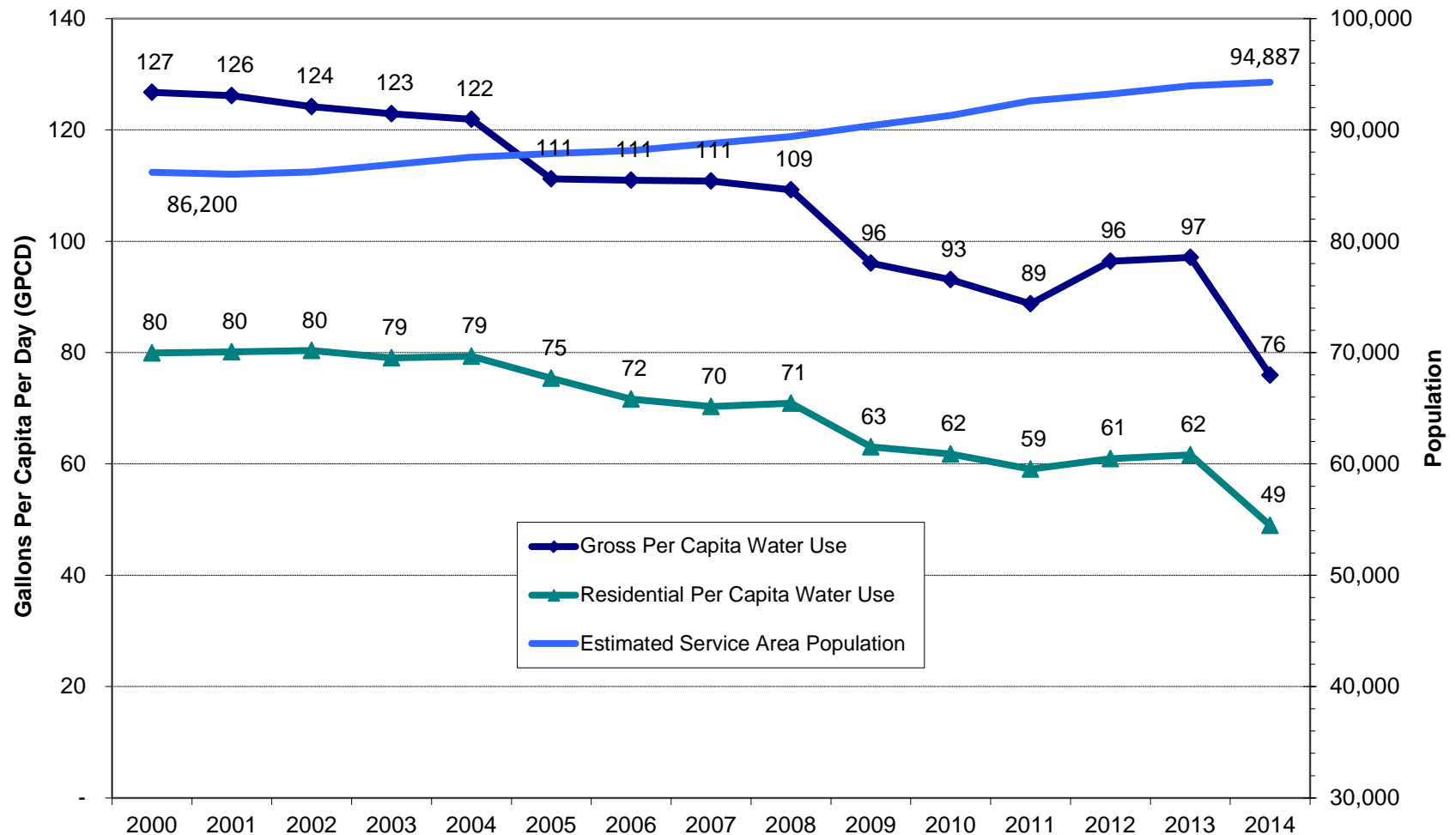
Per Capita Water Use

- 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?

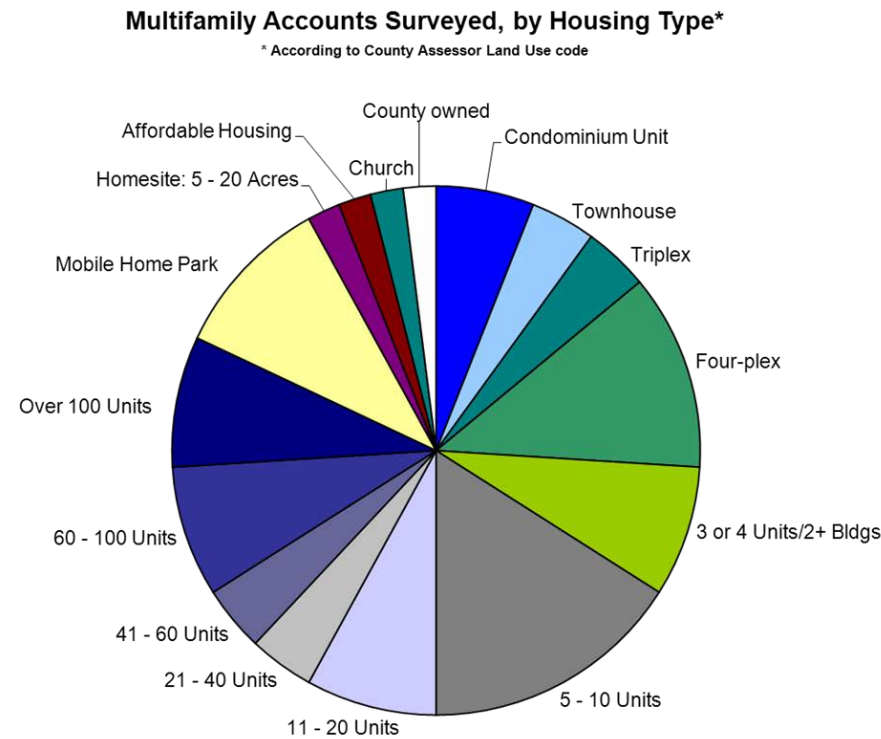
Baseline Survey

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



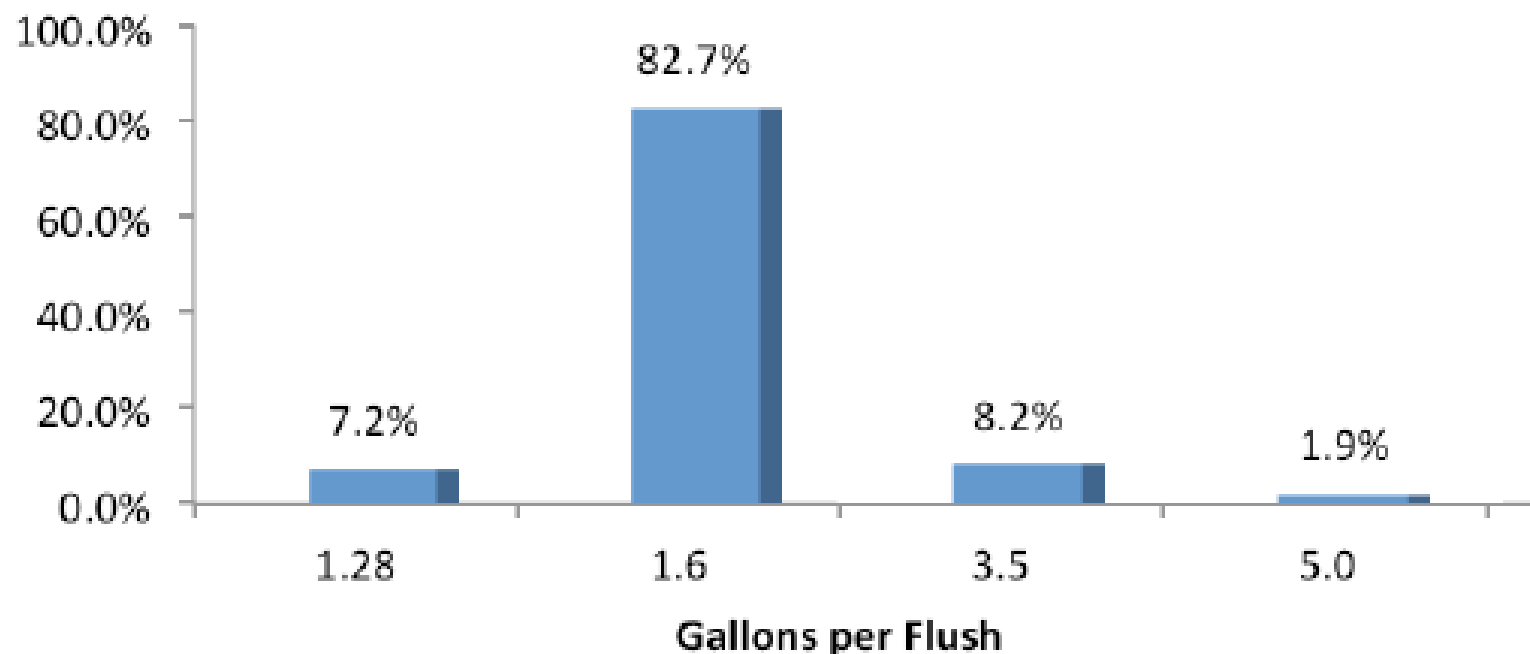
Indoor Water Use Characteristics, by sector

	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

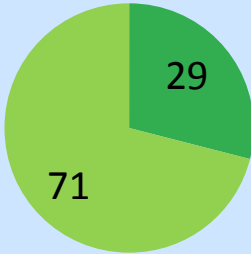
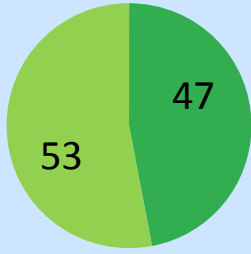
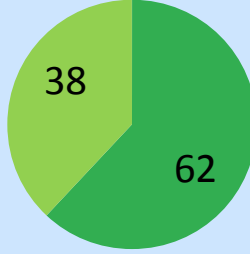
Mean=1.8; Median=1.6




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			

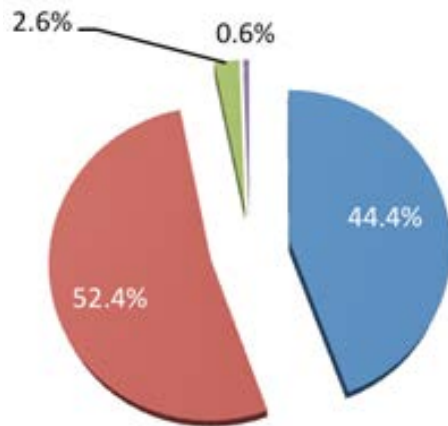


■ Turf

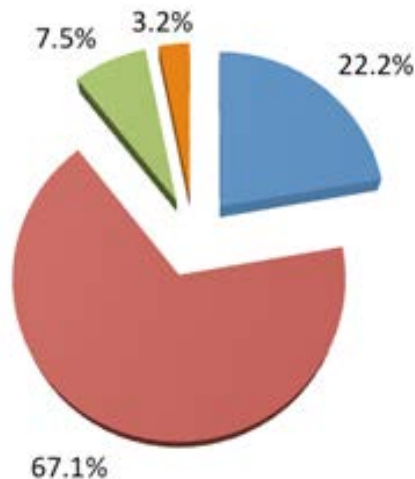
■ Non-turf

Irrigation Equipment

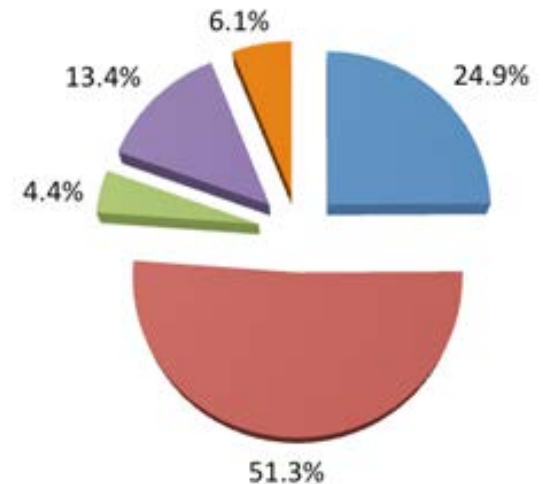
Single Family



Multi-Family



Commercial



■ Drip

■ Spray

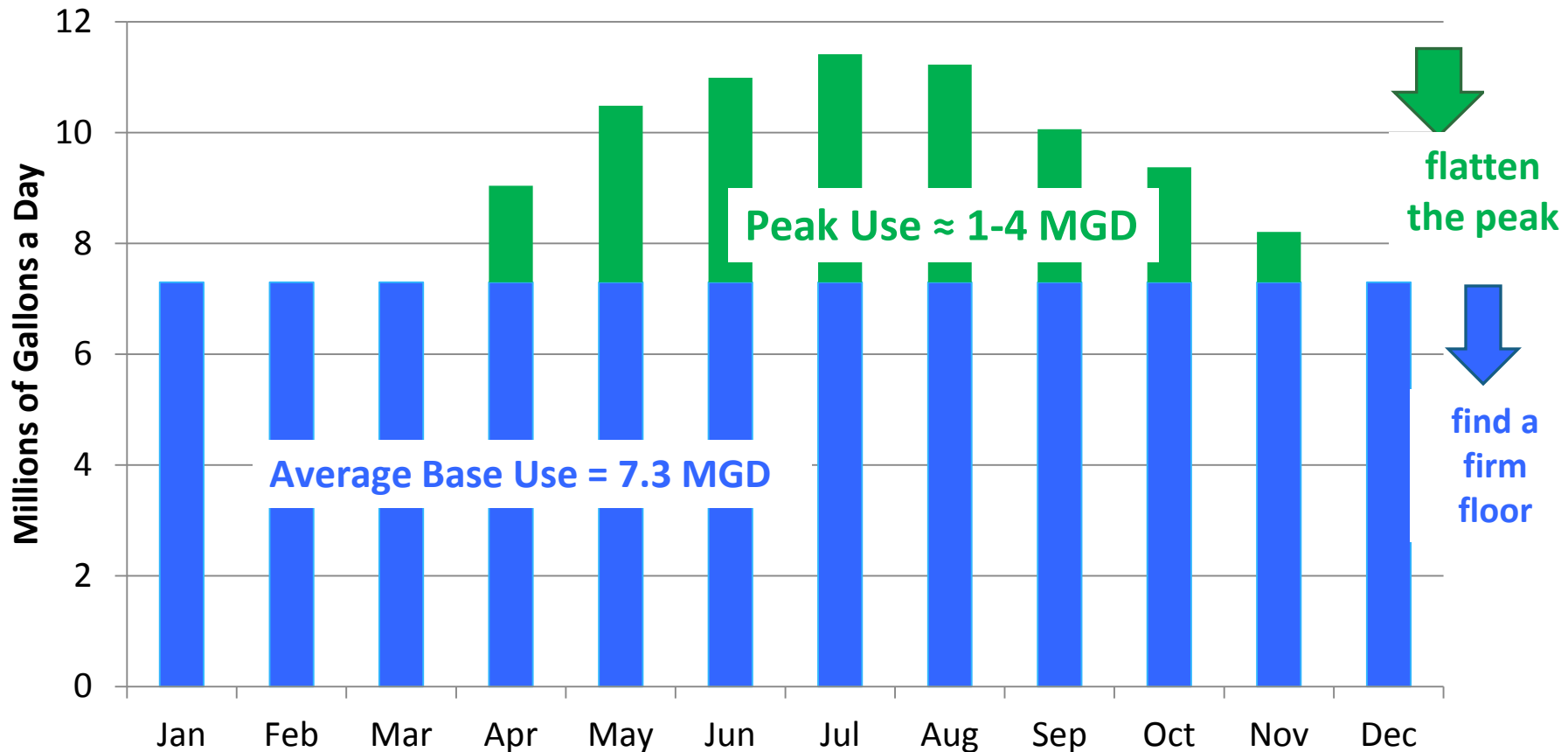
■ Rotor

■ Hose End

■ Not Available

Base vs. Peak Water Use

Peak is mainly outdoor use,
Base is mainly indoor use





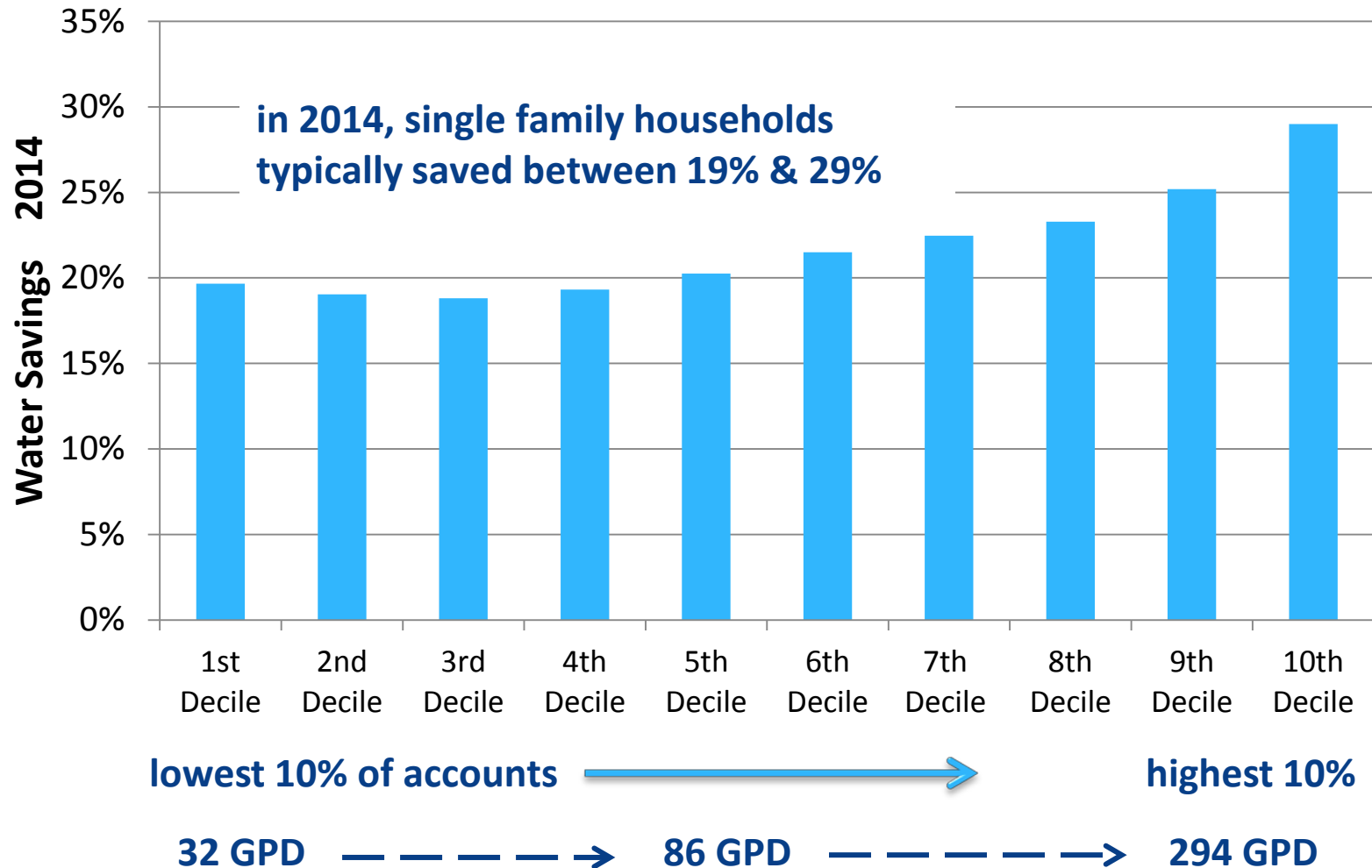
Our Community is Committed to Making Conservation Work, Especially During Droughts

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





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

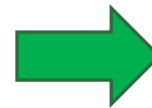
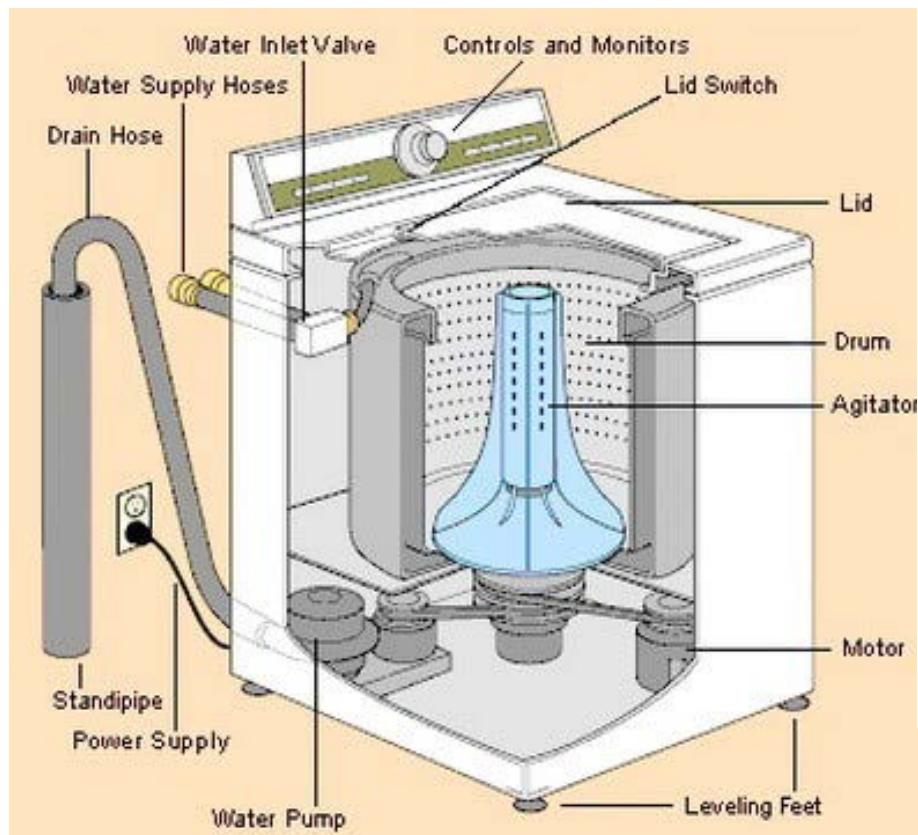
There's Still Potential for Indoor Year-Round Savings

Proportion of Fixtures that are Water-Efficient

	Single Family Homes	Multi-Family Homes	Businesses
Toilets ≤ 1.6 gpf	90%	89%	96%
1.28 gpf	7%	3%	14%
Washing Machines ≤ 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

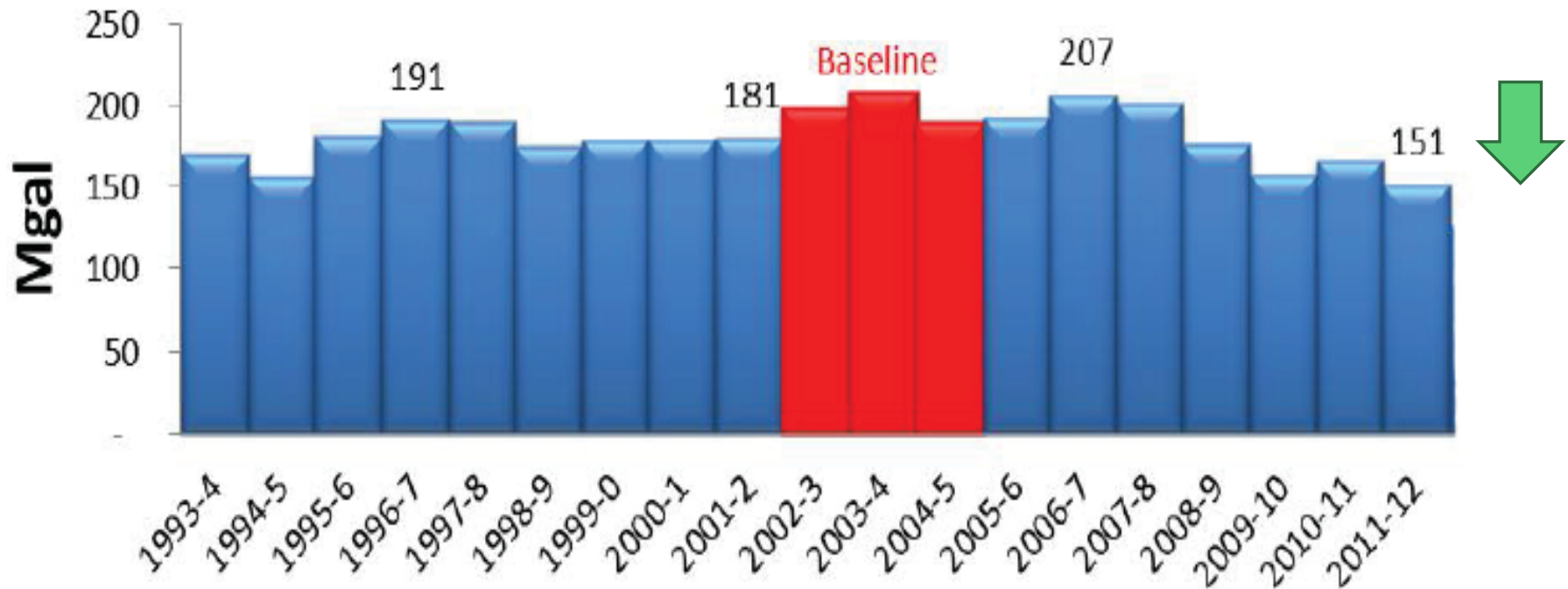
- **2015 rebates**
 - \$100 from the City
 - \$50 from PG&E
 - covers the cost difference of a HE washer
- from 30-40 gallons to 12 gallons/load, save 60-70%
- at 50 loads a year, save up to 1400 gals (2 units) a year per person
- save on energy for water heating and clothes drying, too

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

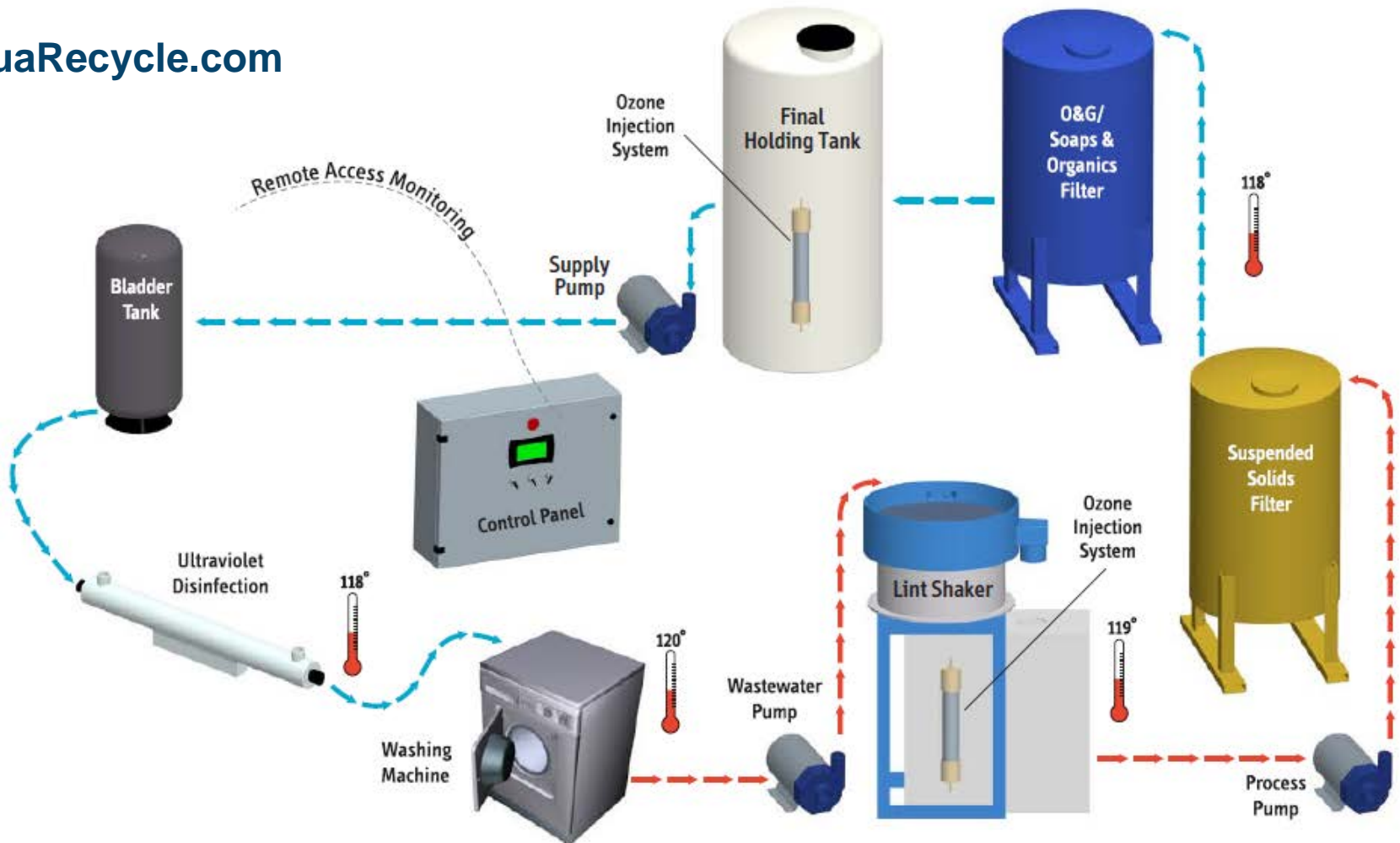
Hotel & Commercial Laundry Water Reuse



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



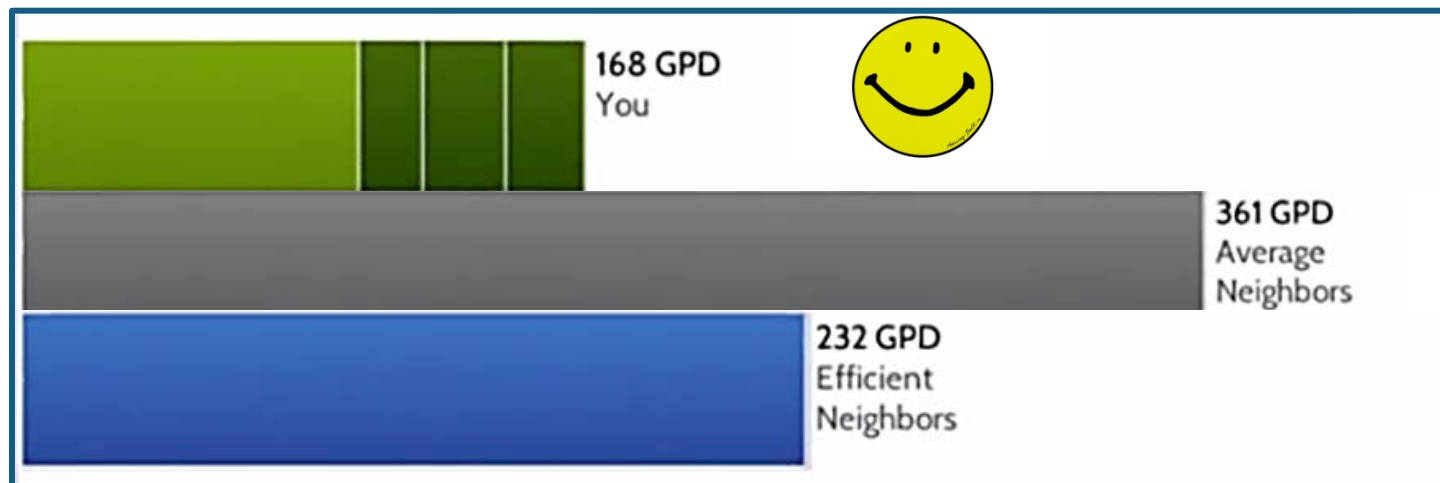
Commercial & Institutional Users – Water Efficiency Practices

- 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:

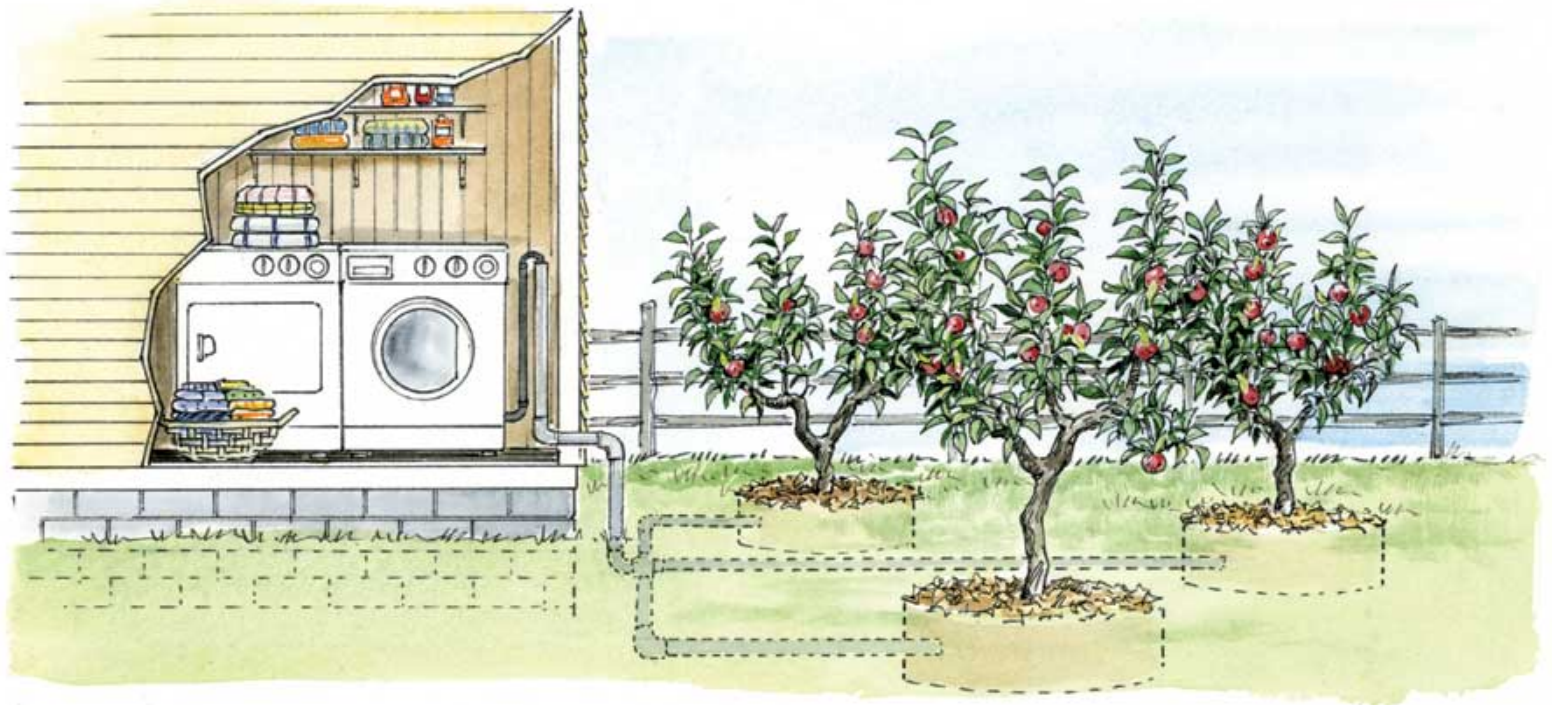


Check out their garden galleries, tips and find local landscapers to help with your design.

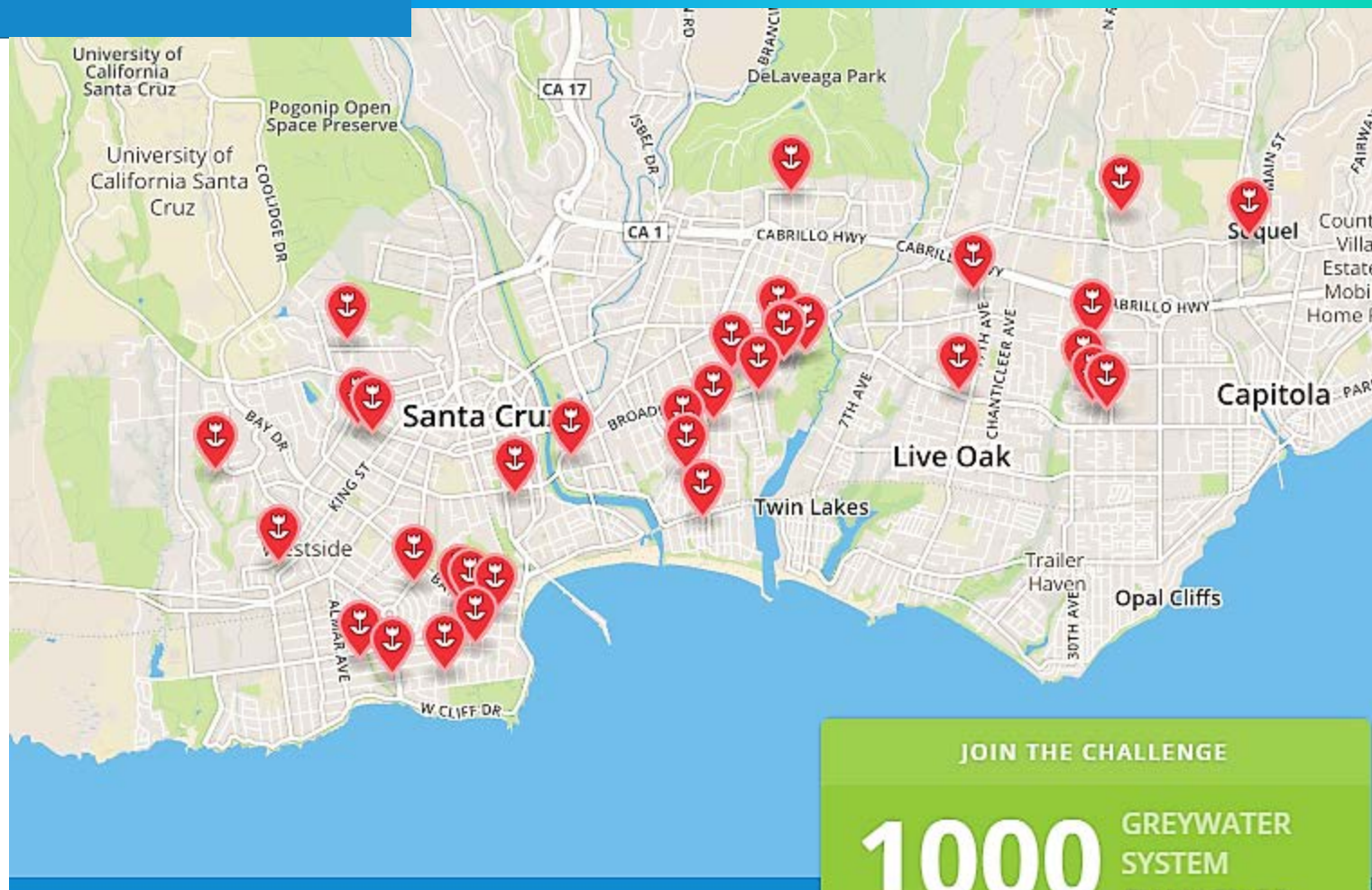
Start small...or go **BIG!**

- **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">• 4 units per couple• \$25-\$100/year in Tier 3 or higher• paid off in 2-4 years
Turf Replacement	\$3/sq ft	<ul style="list-style-type: none">• at \$25 per unit (penalty rate)• paid off in 5 years

Infiltrate Our Rainwater



Aquifer Recharge

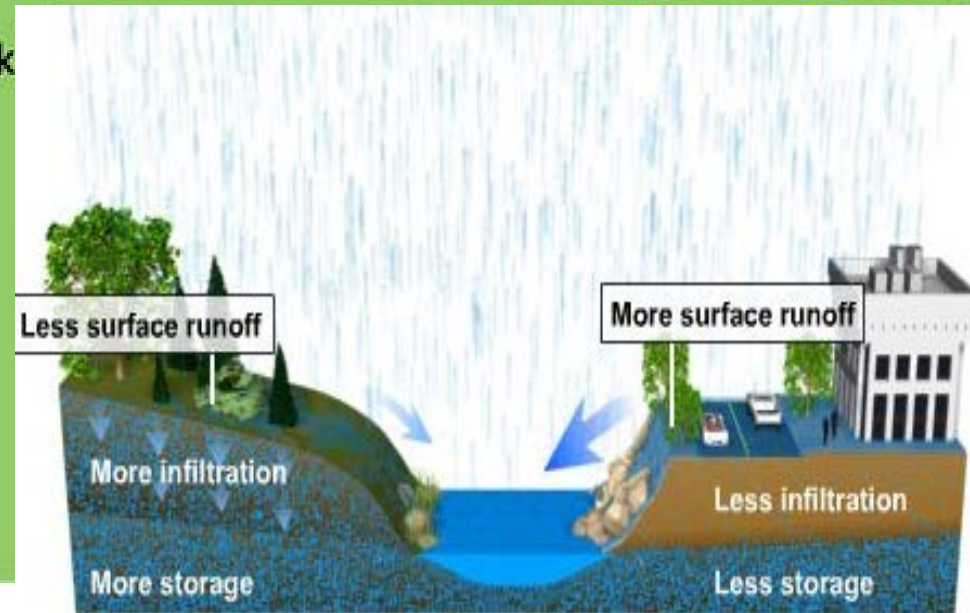
Aquifer Recharge Begins At Home Maximizing Rainwater Infiltration in Our Landscapes

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

