Stockton District
Conservation Master Plan: 2011 - 2015

California Water Service Company

Prepared by

M.Cubed
Gary Fiske and Associates, Inc.
A&N Technical Services, Inc.

April 2011

Table of Contents

List of Acronyms/Abbreviations vi
Executive Summary vii
ES-1 Introduction vii
ES-2 Baseline Per-Capita Demand viii
ES-3 Demand-Reduction Targets viii
ES-3.1 SBx7-7 Requirements ix
ES-3.2 MOU Requirements x
ES-3.3 Gross and Net Savings Requirements x
ES-4 Conservation Program Analysis xi
ES-5 Portfolio Development xvii
ES-6 Required Staffing and Expenditure Levels xix
ES-6.1 Administration and Research xix
ES-6.2 Public Information and School Education xix
ES-6.3 Cost Summary xix
ES-6.4 Expected Savings xx
ES-7 Plan Monitoring and Updates xxi
1 Introduction 1
1.1 Master Plan Scope and Objectives 1
1.2 Plan Development 2
1.3 Report Organization 3
2 District Profile 5
2.1 Introduction 5
2.2 Service Area Description 5
2.3 Population and Service Connections 5
2.4 Historical Water Demand 7
2.5 Unadjusted Baseline Water Demand Projection 9
2.6 Local Water Supply Issues 11
2.7 Future Water Cost 12
2.7.1 Short-Run Avoided Costs 12
2.7.2 Long-Run Avoided Costs 13
2.8 Future Water Rates 13

3 Statewide Urban Water Demand Reduction Policies 15
3.1 Introduction 15
3.2 CPUC GPCD Policy 15
3.3 State Per Capita Water Use Policies and Targets 15
3.3.1 SBx7-7 GPCD Reduction Targets 15
3.3.2 Regional Compliance 16
3.3.3 Cal Water SBx7-7 Compliance Strategy 17
3.4 Urban Water Conservation MOU 18
3.4.1 MOU Compliance Options 18
3.4.2 Cal Water MOU Compliance Strategy 19
4 SBx7-7 and MOU Savings Targets 21
4.1 Introduction 21
4.2 SBx7-7 Target Calculation 21
4.3 MOU Flex Track Target Calculation 23
4.4 Difference from Unadjusted Baseline Water Use 25
5 Water Savings Required from New Programs 26
5.1 Introduction 26
5.2 Expected Savings from Efficiency Codes 26
5.3 Expected Savings from Rates 28
5.4 Expected Savings from Current Programs 28
5.5 Adjusted Baseline Demand 29
5.6 Water Savings Needed from New Programs 29
6 Conservation Program Analysis 31
6.1 Introduction 31
6.2 Conservation Program Concepts 31
6.2.1 Concept Screening 35
6.2.2 Preliminary Quantitative Analysis 37
6.2.3 Identification of Core and Non-Core Programs 38
6.3 Benefit-Cost Analysis of Core and Non Core Programs 41
7 Portfolio Development 43
7.1 Introduction 43
7.2 SBx7-7 and MOU Savings Targets 43
7.3 2011-13 General Rate Case Decision 43
7.4 Minimum and Maximum Program Levels 44

7.5 Recommended Annual Program Activity and Staff Levels 44
7.5.1 Residential and Non-Residential Conservation Programs 44
7.5.2 Administration & Research 45
7.5.3 Public Information & School Education 46
7.6 Projected Annual Program Expenditures 46
7.7 Projected Portfolio Water Savings 48
7.8 Projected Water Demands 49
7.9 Program Cut Sheets 50
8 Plan Monitoring and Updates 51
8.1 Introduction 51
8.2 Program Tracking 51
8.3 2014-16 General Rate Case 51
8.4 2015 UWMP 51
8.5 MOU Flex Track Target 51
8.6 Water Savings Verification 52
8.7 Local Codes and Ordinances 52
8.8 2015 Plan Update 52
Appendix 1 Conservation Program Cut Sheets
Appendix 2 Conservation Program Modeling Assumptions and Results

Report Tables

Table ES-1. Cal Water Districts Sorted by Hydrologic Region ix
Table ES-2. Stockton District Gross Savings Required for SBx7-7 and MOU Compliance xi
Table ES-3. Stockton District New Program Savings Required for SBx7-7 and MOU Compliance xi
Table ES-4. Stockton District Program Concepts Passing Qualitative Screen xii
Table ES-5. Cal Water Conservation Programs xv
Table ES-6. Stockton District Core and Non-Core Program Benefit-Cost Ratios xvi
Table ES-7. Stockton District GRC Conservation Program Expenditure Constraints xvii
Table ES-8. Stockton District Recommended Residential and Non-Residential Program Levels xviii
Table ES-9. Stockton District Projected Annual Conservation Expenditures xx
Table ES-10. Stockton District Projected Water Savings by Customer Class xx
Table ES-11. Stockton District Recommended Portfolio Projected 2015 Demand xxi
Table 2-1. Stockton District Historical and Projected Population 6
Table 2-2. Stockton District Service Connections 7
Table 2-3. Stockton District Unadjusted Baseline Demand Projection 10
Table 2-4. Stockton District Avoided Cost Forecast 13
Table 2-5. Stockton District Nominal Change in Service Rates 14
Table 3-1. Cal Water Districts Sorted by Hydrologic Region 17
Table 3-2. MOU Best Management Practices 20
Table 4-1. Stockton District SBx7-7 GPCD Targets 22
Table 4-2. Programmatic BMPs Used to Calculate Flex Track Target 24
Table 4-3. Stockton District 2015 MOU Flex Track Target 25
Table 4-4. Stockton District Gross Savings Required for SBx7-7 and MOU Compliances 25
Table 5-1. Stockton District 2011-2015 Code-Driven Water Savings 27
Table 5-2. Stockton District 2011-2015 Water Savings from Proposed Rate Adjustment 28
Table 5-3. Stockton District Water Savings from 2009-10 Conservation Programs 29
Table 5-4. Stockton District Adjusted Baseline Demand Projection 29
Table 5-5. Stockton District New Program Savings Required for SBx7-7 and MOU Compliance 30
Table 5-6. Stockton District 2015 GPCD Required for SBx7-7 and MOU Compliance 30
Table 6-1. Stockton District Indoor Conservation Program Concepts 33
Table 6-2. Stockton District Outdoor Conservation Program Concepts 34
Table 6-3. Stockton District General Conservation Program Concepts 35
Table 6-4. Stockton District Program Concepts Passing Qualitative Screen 36
Table 6-5. Cal Water Conservation Programs 40
Table 6-6. Stockton District Core and Non-Core Program Benefit-Cost Ratios 42

Table 7-1. Stockton District GRC Conservation Program Expenditure Constraints .. 43
Table 7-2. Stockton District Recommended Residential and Non-Residential Program Levels 45
Table 7-3. Stockton District Projected Annual Conservation Expenditures 47
Table 7-4. Stockton District Projected Water Savings by Program 49
Table 7-5. Stockton District Projected Water Savings by Customer Class 49
Table 7-6. Stockton District Recommended Portfolio Projected 2015 Demand 50

Report Figures

Figure ES-1. Stockton District Historical Per Capita Demand viii
Figure 2-1. General Location of Stockton District 6
Figure 2-2. Stockton District Distribution of Services by Customer Type 7
Figure 2-3. Stockton District Historical Demand 8
Figure 2-4. Stockton District Percent of Total Demand by Type of Use 8
Figure 2-5. Stockton District Historical Per Capita Demand 9
Figure 2-6. Stockton District Unadjusted Baseline Demand Projection 10
Figure 4-1. Stockton District SBx7-7 Per Capita Target Demand 23
Figure 7-1. Cal Water Conservation Program Management Regions 46
Figure 7-2. Stockton District 2011-15 Conservation Expenditure Shares 48

List of Acronyms/Abbreviations

AF	Acre-Feet
AFY	Acre-feet Per Year
BCR	Benefit-Cost Ratio
BMP	Best Management Practice, as in MOU Conservation BMPs
Cal Water	California Water Service Company
CII	Commercial, Industrial, Institutional
Comm	Commercial
Cont	Contractor
CPUC	California Public Utilities Commission
Cust	Customer
CUWCC	California Urban Water Conservation Council
CW	Clothes Washer
Dist	Distributor
DWR	California Department of Water Resources
ETo	Reference Evapotranspiration
GPCD	Gallons Per Capita Per Day
GPM	Gallons Per Minute
GRC	General Rate Case
HE	High-Efficiency, as in HE Toilets
HECW	High-Efficiency Clothes Washer
HET	High-Efficiency Toilet
HR	Hydrologic Region
Inc	Incentive
Irrig or Irr	Irrigation
Lg	Large, as in Large Landscape Survey
Lndscp	Landscape
MCL	Maximum Contaminant Level
MOU	Memorandum of Understanding Regarding Urban Water Conservation in California
NAICS	North American Industrial Classification System
Reb	Rebate
SBx7-7	Senate Bill 7 (Steinberg), The Water Conservation Act of 2009
SWP	State Water Project
ULFT	Ultra Low Flush Toilet
UWMP	Urban Water Management Plan
UWMPA	Urban Water Management Planning Act
WBIC	Weather-Based Irrigation Controller (also called “Smart Controllers”)
WSS	WaterSense Specification

Executive Summary

ES-1 Introduction

California Water Service Company (Cal Water) is in the process of expanding current conservation programs and developing new programs for its 24 service districts. Over the next five years, Cal Water conservation program expenditures are likely to increase significantly due in large measure to recently adopted state policies requiring significant future reductions in per capita urban water use. These include the passage of Senate Bill No. 7 (SBx7-7) in November 2009, which mandated a statewide 20% reduction in per capita urban water use by 2020, as well as recent decisions by the California Public Utilities Commission (CPUC) directing Class A and B water utilities to adopt conservation programs and rate structures designed to achieve reductions in per capita water use, and the *Memorandum of Understanding Regarding Urban Water Conservation in California* (MOU), of which Cal Water has been a signatory since 1991.

Aside from these mandates, conservation will also help to address local water supply constraints in some districts.

In preparing for this program expansion, Cal Water has spent the past year developing five-year conservation program plans for each of its service districts. Each district plan was developed with the following questions in mind:

- How much water conservation will each district need to implement in order to comply with state urban per capita water use targets?
- How much of this conservation requirement can be met by existing water efficiency codes and ordinances, scheduled increases in water rates, and past investment in conservation programs?
- How much of this conservation requirement will need to be met through new investments in conservation?
- Which water conservation programs at what levels of activity result in the most benefit to Cal Water ratepayers?
- Should existing programs be expanded, new programs developed, or both?
- How can conservation be used to help address local water supply constraints?
- How many conservation programs can Cal Water reasonably expect to operate given the geographic dispersion of its districts, and staffing and

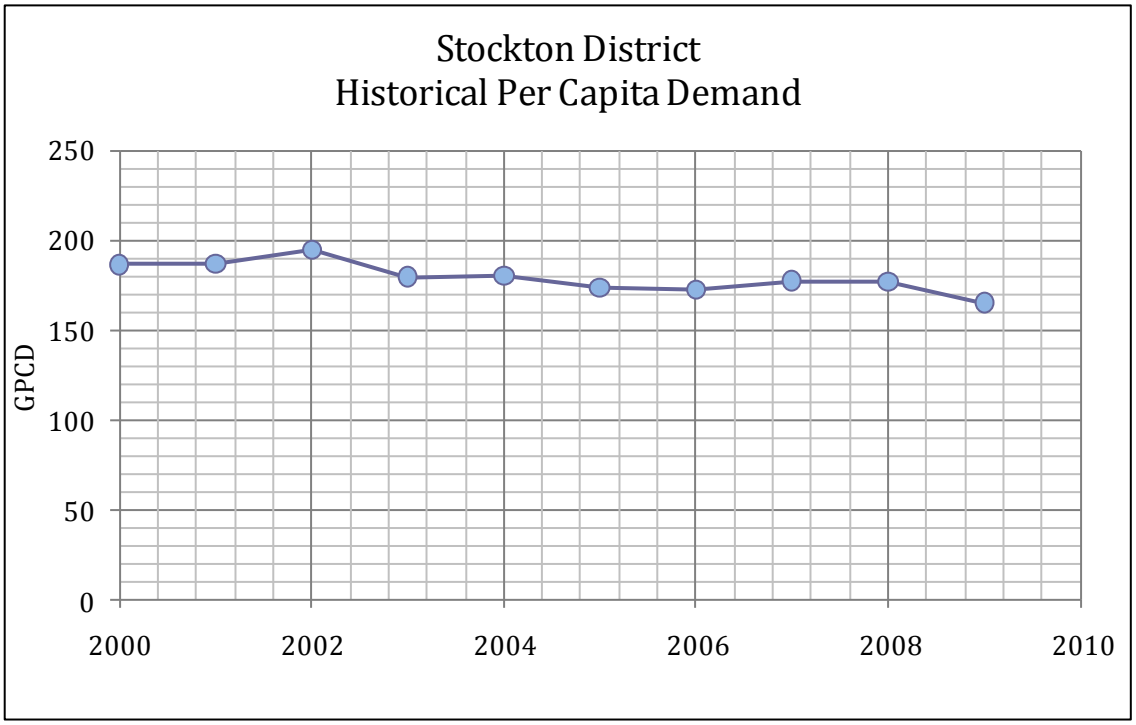
budgetary constraints?

- How can regional partnerships be leveraged to more efficiently achieve a district's water conservation targets?

ES-2 Baseline Per-Capita Demand

The determination of the required future demand reductions must begin with a clear understanding of past and current per-capita demands. Per capita demand (Figure ES-1) has trended down over the last decade. In the last five years, per capita demand has averaged 173 gallons per day. Per capita water use in the district is about 30% lower than average per capita use in the San Joaquin River hydrologic region, which the California Department of Water Resources (DWR) estimated at about 248 gallons per day. The district's relatively low per capita water use is expected to help it comply with state legislation passed in 2009 requiring urban water suppliers to reduce per capita water use by 20% by 2020.

Figure ES-1. Stockton District Historical Per Capita Demand



ES-3 Demand-Reduction Targets

The two statewide policies that result in quantified future demand reduction targets are those of SBx7-7 and the MOU. Following are brief discussions of each of these requirements.

ES-3.1 SBx7-7 Requirements

Senate Bill 7 (SBx7-7), which was signed into law in November 2009, amended the State Water Code to require a 20% reduction in urban per capita water use by 2020. Commonly known as the 20x2020 policy, the new requirements apply to every retail urban water supplier subject to the Urban Water Management Planning Act (UWMPA).

SBx7-7 requires the state to achieve a 20% reduction in urban per capita water use by December 31, 2020. The state is required to make incremental progress toward this goal by reducing per capita water use by at least 10% on or before December 31, 2015. SBx7-7 requires each urban retail water supplier to develop interim and 2020 urban water use targets in accordance with specific requirements. They will not be eligible for state water grants or loans unless they comply with those requirements.

The law provides each water utility several ways to calculate its interim 2015 and ultimate 2020 water reduction targets. In addition, water suppliers are permitted to form regional alliances and set regional targets for purposes of compliance. Under the regional compliance approach, water suppliers within the same hydrologic region can comply with SBx7-7 by either meeting their individual target or being part of a regional alliance that meets its regional target. Cal Water districts sorted by hydrologic region are shown in Table ES-1.

Table ES-1. Cal Water Districts Sorted by Hydrologic Region

Hydrologic Region	**Cal Water Districts in Region**
North Coast	Redwood Valley
San Francisco Bay Area	Bear Gulch, Livermore, Los Altos, Mid-Peninsula, South San Francisco
Central Coast	King City, Salinas
South Coast	Domiguez, East LA, Hermosa-Redondo, Palos Verdes, Westlake
Sacramento River	Chico, Dixon, Marysville, Oroville, Willows
San Joaquin River	**Stockton**
Tulare Lake	Bakersfield, Kern River Valley, Selma, Visalia
North Lahontan	None
South Lahontan	Antelope Valley
Colorado River	None

Cal Water's SBx7-7 compliance strategy involves:

1. Identifying for each district the largest allowable interim and 2020 GPCD targets under the relevant compliance methods allowed by the statute;[1]

2. Grouping districts by hydrologic region and calculating population-weighted regional targets where applicable; and

3. Developing conservation programs aimed at achieving the regional and/or district-specific targets.

Because Stockton District is the only Cal Water district in the San Joaquin River hydrologic region, regional compliance is not an option for it.

ES-3.2 MOU Requirements

Administered by the California Urban Water Conservation Council (CUWCC), the *Memorandum of Understanding Regarding Urban Water Conservation in California* (MOU) has guided urban water conservation programs in California since it was first adopted in 1991. There are three ways in which a water supplier can comply with the MOU. The first way is to implement a set of water conservation best management practices (BMPs) according to the requirements and schedules set forth in Exhibit 1 of the MOU. The second way, called Flex Track compliance, is to implement conservation programs expected to save an equivalent or greater volume of water than the BMPs. The third way, similar to SBx7-7, is to reduce per capita water use. Because the Flex Track compliance option affords the most flexibility in selecting conservation programs suited to each Cal Water district and allows for more streamlined reporting, Cal Water plans to use Flex Track to comply with the MOU. Because CUWCC tools for calculating a district's Flex Track savings target are not yet available, Cal Water developed its own target estimates for planning purposes.

ES-3.3 Gross and Net Savings Requirements

Table ES-2 shows the gross savings required under SBx7-7 and MOU Flex Track compliance. These, however, do not reflect the savings that are required to be achieved from new conservation programming, which are net of the expected savings from water efficiency codes, expected future rate adjustments, and already-existing conservation programs. Even without these adjustments, however, the district's 2015 demand is projected to be less than its 2015 demand target under SBx7-7. Adjustments to gross demand are shown in Table ES-3. While adjusted demand is projected to be 251 AF less than the SBx7-7 demand target, the analysis indicates the district will need an additional 91 AF of conservation to meet its MOU Flex Track target.

[1] District-specific targets are based either on Method 1 or Method 3, as defined in SBx7-7, whichever yielded the highest per capita target for the district.

Table ES-2. Stockton District Gross Savings Required for SBx7-7 and MOU Compliance

Gross Water Savings Required by 2015	SBx7-7	MOU Flex Track
2015 Unadjusted Baseline Demand	32,036 AF	32,036 AF
2015 Target Demand	32,107 AF	31,910 AF
Gross Savings Requirement	**-71 AF**	**126 AF**

Table ES-3. Stockton District New Program Savings Required for SBx7-7 and MOU Compliance

2015 Net Savings Requirement (AF)	SBx7-7	MOU Flex Track
Gross Savings Requirement	**-71**	**126**
Less		
Savings from codes	295	NA
Savings from rates	-150	NA
Savings from existing programs	35	35
Subtotal Expected Savings	*180*	*35*
Savings Required from New Programs[1]	**-251**	**91**

[1]*Negative net savings indicates that no new program savings required for compliance*

ES-4 Conservation Program Analysis

As a result of an exhaustive search of the literature, consultation with experts in the field, knowledge of conservation programming by other water suppliers, and the experience of the project team, a universe of more than 75 conservation program concepts was defined. At this point in the process, the goal was to be as inclusive as possible. The list was therefore intentionally large to ensure that all possible program concepts were considered. Cal Water did not want to risk inadvertently excluding a program from consideration.

For the purposes of this plan, a conservation program concept is comprised of two components:

- Targeted technologies or changes in customer behavior; and
- A delivery mechanism by which customers will be encouraged (or required) to adopt the technology(ies) or change their behavior.

Each program may apply to multiple customer classes (Single Family, Multi-Family, Commercial/ Industrial/Institutional, and Large Landscape).

Once the universe of program concepts was defined, the next step was to subject each program concept to a careful district-specific qualitative screen, the objective of which was to eliminate those program concepts that were clearly inappropriate. For this purpose, six screening criteria were developed. For each program concept, Cal Water staff answered "yes" or "no" for each of these criteria. A "yes" answer on all of these criteria was considered to be essential for program success. Thus, a negative response to any one of the criteria for a particular program concept eliminated that concept from further consideration.

The programs passing the qualitative screen for Stockton District are shown in Table ES-4.

Table ES-4. Stockton District Program Concepts Passing Qualitative Screen

		CUSTOMER CLASS			
Technology/Intervention	**Delivery Mechanism**	**Single Family**	**Multi-Family**	**CII**	**Lg Lndscp**
INDOOR					
HE Toilets	Customer rebates or vouchers	x	x	x	
	Vendor, distributor & contractor incentives	x	x	x	
	Distribution (by utility, community group, vendor)	x	x	x	
	Direct install	x	x	x	
Urinals	Customer rebates or vouchers			x	
	Vendor, distributor & contractor incentives			x	
	Distribution (by utility or vendor)			x	
	Valve replacement			x	
Clotheswashers: in-unit, common area, & coin-op	Customer rebates & vouchers	x	x	x	
	Vendor, distributor & contractor incentives	x	x	x	
Industrial laundries	Audits			x	
	Customized incentives			x	
Showerhead (2.0, 1.5 gpm)/ flapper/aerators	Kit distribution or install	x	x		
Shower timers, Reminder cards	Distribution	x	x		
Cooling Towers	Customer rebates, customized incentives			x	

		CUSTOMER CLASS			
Technology/Intervention	**Delivery Mechanism**	**Single Family**	**Multi-Family**	**CII**	**Lg Lndscp**
Food Steamers	Customer rebates			x	
Ice Machines	Customer rebates			x	
Steam Sterilizers	Customer rebates			x	
Vacuum Pumps	Customer rebates			x	
Car Washes	Customer rebates			x	
	Audits			x	
Spray valves	Customer rebates			x	
	Audits			x	
X Ray film & photo processors	Customer rebates			x	
Industrial process	Audits & incentives			x	
OUTDOOR					
Large Landscape Surveys					x
WBIC	Direct Install	x	x	x	x
	Customer rebate	x	x	x	x
	Vendor, distributor & contractor incentives	x	x	x	x
	Distribution	x	x	x	x
Irrigation System (including, but not limited to, high efficiency nozzles for pop-up heads, drip, soil moisture sensors, rain shut off, pressure control)	Customer rebate	x	x	x	x
	Vendor, distributor & contractor incentives	x	x	x	x
Landscape design	Customer rebate	x	x	x	x
	Vendor, distributor & contractor incentives	x	x	x	x
Turf buy back (Cash for Grass)	Customer rebate	x	x	x	x
Large Landscape Water Use Reports					x
Pool, hot tub covers & other upgrades	Customer rebate or voucher	x	x	x	
GENERAL					
Audits & Surveys (incl high bill contacts)		x	x	x	x
Water use meter alerting device		x	x	x	
Water recycling, grey water use, rainwater harvesting	Customized incentives	x	x	x	
Education/outreach		x	x	x	x

The savings and cost parameters associated with each of these program concepts were then identified and each program concept was subjected to a preliminary quantitative analysis to help Cal Water distinguish between core and non-core programs. A key challenge facing Cal Water is finding a way to efficiently scale up conservation programming across its 24 districts with the limited staffing it has to implement and manage these programs. The current General Rate Case (GRC) decision authorizes 4 full-time conservation program staff for 2011-13. These staff

will be responsible for implementing and managing programs in 24 geographically dispersed districts serving a combined population of over 1.7 million.[2]

Even with the added staffing beginning in 2014 that Cal Water intends to propose to the CPUC, the most efficient way for Cal Water to manage programs across its geographically dispersed districts is to standardize programs and centralize their implementation and oversight. Using the results of the qualitative screening and the preliminary quantitative analysis, Cal Water identified five core programs that it would run in every district over the next five years.

In addition to the core programs, an additional set of non-core programs was selected. Unlike core programs, Cal Water may not offer non-core programs in every district or in every year. Implementation of non-core programs will depend on whether additional water savings are required for SBx7-7 or MOU compliance, or to help address local supply constraints.

The set of core and non-core programs that Cal Water will offer over the next five years is shown in Table ES-5.

[2] By way of comparison, the East Bay Municipal Utility District has a conservation program staff of 21 full-time positions serving a population of 1.3 million within a geographically contiguous and compact service area.

Table ES-5. Cal Water Conservation Programs

Program Name	Description	Target Market
CORE PROGRAMS		
Rebate/Vouchers for toilets, urinals, and clothes washers	Provide customer rebates for high-efficiency toilets, urinals, and clothes washers	All customer segments
Residential Surveys	Provide residential surveys to low-income customers, high-bill customers, and upon customer request or as pre-screen for participation in direct install programs	All residential market segments
Residential Showerhead/Water Conservation Kit Distribution	Provide residential showerhead/water conservation kits to customers upon request, as part of residential surveys, and as part of school education curriculum	All residential market segments
Pop-Up Nozzle Irrigation System Distribution	Offer high-efficiency pop-up irrigation nozzles through customer vouchers or direct install.	All customer segments
Public Information/Education	Provide conservation messaging via radio, bill inserts, direct mail, and other appropriate methods. Provide schools with age appropriate educational materials and activities. Continue sponsorship of Disney Planet Challenge program.	All customer segments
NON-CORE PROGRAMS		
Toilet/Urinal Direct Install Program	Offer direct installation programs for replacement of non-HE toilets and urinals	All customer segments
Smart Irrigation Controller Contractor Incentives	Offer contractor incentives for installation of smart irrigation controllers	All customer segments
Large Landscape Water Use Reports	Expand existing Cal Water Large Landscape Water Use Report Program providing large landscape customers with monthly water use reports and budgets	Non residential customers with significant landscape water use and potential savings
Large Landscape Surveys & Irrigation System Incentives	Provide surveys and irrigation system upgrade financial incentives to large landscape customers participating in the Large Landscape Water Use Reports programs and other targeted customers	Non residential customers with significant landscape water use and potential savings
Food Industry Rebates/Vouchers	Offer customer/dealer/distributor rebates/vouchers for high-efficiency dishwashers, food steamers, ice machines, and pre-rinse spray valves	Food and drink establishments, institutional food service providers
Cooling Tower Retrofits	Offer customer/dealer/distributor rebates/vouchers of cooling tower retrofits	Non-residential market segments with significant HVAC water use
Industrial Process Audits and Retrofit Incentives	Offer engineering audits/surveys and financial incentives for process water efficiency improvement	Non-residential market segments with significant industrial process water uses

A detailed benefit-cost analysis was then performed for all of the core and non-core programs, the results of which are shown in Table ES-6.

Table ES-6. Stockton District Core and Non-Core Program Benefit-Cost Ratios

Program ID	Program Name	Customer Class	BCR
1	HE Toilets: Cust Rebates or Vouchers	Single Family	0.94
2	HE Toilets: Cust Rebates or Vouchers	Multi Family	2.01
3	HE Toilets: Cust Rebates or Vouchers	Commercial	0.56
4	Clotheswasher: Cust Reb or Voucher	Single Family	0.33
5	CW common: Cust Reb or Voucher	Multi Family	0.38
6	CW in-unit: Cust Reb or Voucher	Multi Family	0.24
7	CW coin-op: Cust Reb or Voucher	Commercial	0.48
8	Urinals (0.25 gpf): Cust Rebates or Vouchers	Commercial	0.37
9	HE Toilets: Direct Install	Single Family	0.41
10	HE Toilets: Direct Install	Multi Family	1.19
11	HE Toilets: Direct Install	Commercial	0.33
12	Urinals: Direct Install	Commercial	0.40
13	Audits & Surveys (incl high bill contacts)	Single Family	0.26
14	Audits & Surveys (incl high bill contacts)	Multi Family	0.30
15	Audits & Surveys (incl high bill contacts)	Commercial	0.31
16	High Efficiency Pop-Up Nozzle Web Voucher	Single Family	2.53
17	High Efficiency Pop-Up Nozzle Web Voucher	Multi Family	2.53
18	High Efficiency Pop-Up Nozzle Web Voucher	Commercial	2.53
19	Showerhead/Aerator,Tablet Kit Dist	Single Family	0.47
20	Showerhead/Aerator,Tablet Kit Dist	Multi Family	0.47
21	WBIC Vendor, Dist, & Cont Inc	Single Family	0.28
22	WBIC Vendor, Dist, & Cont Inc	Multi Family	0.63
23	WBIC Vendor, Dist, & Cont Inc	Commercial	0.63
24	Large Landscape Water Use Reports	Irrigation	0.27
25	Lg Lndscp Surveys & Irrig Sys: Rebates	Irrigation	0.53
26	Comm Irrigation System: Rebates	Commercial	2.14
27	Dishwashers: Vendor, Dist & Cont Inc	Commercial	3.63
28	Food Steamers: Cust Rebates	Commercial	0.41
29	Ice Machines: Cust Rebates	Commercial	1.65
30	Pre-Rinse Spray Valves: Cust rebates	Commercial	1.53
31	Cooling Tower Cond Cont: Cust Reb, Inc	Industrial	0.79
32	Cooling Tower pH Cont: Cust Reb, Inc	Industrial	0.80
33	Industrial Process: Audits & Incentives	Industrial	0.59

ES-5 Portfolio Development

The program analysis results described above provided the starting point for portfolio development. The next step was to determine the annual levels of program activity needed to, at minimum, meet Stockton District's water savings targets. Several considerations informed these decisions, including budgetary constraints included in the current GRC decision, Cal Water conservation program administrative capacity, program market and water savings potential, and the program benefit-cost results shown in Table ES-6.

Table ES-3 showed that water savings from existing water efficiency codes and ordinances, scheduled adjustments to water rates, and past investment in conservation programs are expected to be sufficient to meet Stockton District's 2015 SBx7-7 per capita water use target. It also showed that an additional 91 AF of water savings from new programs would be required to satisfy MOU compliance requirements in 2015. This established the minimum level of water savings the program portfolio would need to produce by 2015.

Cal Water's current GRC decision established conservation budgets for each district for the years 2011-2013. These budgets specify the total annual expenditure on conservation programs, as well as the maximum amount that can be allocated to (1) program administration and research, (2) public information and school education programs, (3) residential conservation programs, and (4) non-residential conservation programs. Table ES-7 shows these budgetary restrictions for Stockton District.

Table ES-7. Stockton District GRC Conservation Program Expenditure Constraints

Budget Constraint ($000)	**2011**	**2012**	**2013**
Overall Budget	$700.0	$700.0	$700.0
Admin & Research	$86.7	$86.9	$86.9
Public Info & School Educ.	$140.0	$140.0	$140.0
Programmatic Activity	$473.3	$473.1	$473.1
Expenditure Caps			
Residential Programs	$505.5	$505.5	$505.5
Non Residential Programs	$524.0	$524.0	$524.0

For each district, Cal Water then specified minimum and maximum program activity levels to guide portfolio development. The minimum levels were those below which it would not be administratively feasible or cost-effective to offer the program in the district, while the maximum levels were those that could reasonably be achieved given district customer characteristics, current market demand, and past experience marketing similar programs/technologies to district customers. The constraints placed on annual program activity levels are presented in Appendix 2.

Based on the foregoing, Table ES-8 shows the recommended annual program levels for residential and non-residential programs. The program levels were derived from the following decision rules:

- For 2011-13, set annual program activity to maximize water savings subject to the GRC conservation program budget constraints and the min/max annual activity constraints. This ensured that the portfolio would reflect the least-cost mix of core and non-core conservation programs consistent with the GRC budget constraints.

- For 2014-15, set annual activity of programs with BCRs greater than one to their maximum level. This ensured that the portfolio would benefit ratepayers by helping to lower average water supply costs.

- For 2014-15, if needed to satisfy the 2015 district-specific SBx7-7 and MOU Flex Track water savings targets, increase program activity of programs with BCRs less than one in order of cost-effectiveness. This ensured the least-cost set of activity levels needed to achieve the water savings targets.

The decision rules cause programs with BCRs less than one to be set to their minimum implementation levels in 2014 and 15, while programs with BCRs equal to or greater than one to be set to their maximum levels. Hence the large increase in pop-up nozzle distribution and the reduction in customer surveys/audits starting in 2014.

Table ES-8. Stockton District Recommended Residential and Non-Residential Program Levels

Program	Recommended Annual Activity Levels[1]				
	2011	2012	2013	2014	2015
CORE PROGRAMS					
Rebates/Vouchers					
Toilets	740	740	740	420	420
Clothes Washers	200	200	190	170	170
Urinals	0	0	0	0	0
Customer Surveys/Audits	120	120	120	110	110
Conservation Kit Distribution	1,190	1,190	1,190	350	350
Pop-Up Nozzle Distribution	22,200	22,200	22,200	22,200	22,200
NON-CORE PROGRAMS					
Direct Install Toilets/Urinals	430	430	430	510	510
Smart Irr. Controller Vendor Incentives	10	10	10	10	10
Large Landscape Water Use Reports	60	60	60	150	150
Large Landscape Surveys/Incentives	100	100	100	90	90
Commercial Kitchen Rebates/Vouchers	0	0	0	30	30
Cooling Tower/Process Water Retrofit Incentives	10	0	0	0	0

[1]Annual activity levels are aggregated across customer classes and rounded up to the nearest 10 units of activity. Appendix 2 contains the detail modeling results broken down by customer class and program measure.

ES-6 Required Staffing and Expenditure Levels

ES-6.1 Administration and Research

District staff levels and expenditure for administration and research for 2011-13 are set by the current GRC. At present, Cal Water divides its 24 districts into two program management regions which are administered by its two conservation program coordinators. Program reporting and analysis will be conducted by its conservation program analyst. Proposed expenditures for 2014 and 2015 assume two additional conservation program coordinator positions and one additional conservation analyst position for a total of seven full-time positions. Given the scale and diversity of programs proposed in this plan and the geographic dispersion of Cal Water's districts, this is the minimum staffing level recommended for program implementation, and assumes Cal Water will divide its 24 districts into four program management regions. Program administration costs for 2014-15 are prorated to the districts based on their share of company-wide conservation program expenditures.

ES-6.2 Public Information and School Education

District expenditure for public information and school education programs in 2011-13 is set by the current GRC. Recommended expenditures in 2014 and 2015 were set to allow some expansion in these programs to support proposed increases in residential and non-residential program levels.

ES-6.3 Cost Summary

Annual program expenditures for conservation programming, administration and research, and public information and education, based on the recommended program levels and GRC budget allocations are shown in Table ES-9. The plan allocates approximately 67% of projected expenditure to programmatic activity, 21% to public information and education functions, and 12% to administration and research functions. Within the programmatic expenditure category, approximately three-fourths of planned expenditure is for residential conservation programs and one-fourth is for non-residential programs. The allocation of program expenditures between residential and non-residential program categories reflects both the relative cost-effectiveness of residential versus non-residential programs and the program spending caps contained in the current GRC.

Proposed annual expenditures in 2014 and 2015 are about 93% of the annual expenditures allowed under the current GRC. The decrease results from the decision rule to minimize implementation of programs with BCRs less than one.

Table ES-9. Stockton District Projected Annual Conservation Expenditures

Expenditure Category	Projected Annual Expenditures ($000)				
	2011	2012	2013	2014	2015
Program Costs:					
Residential	$361.8	$361.6	$361.6	$298.7	$298.7
Non-Residential	$112.8	$111.5	$111.5	$122.8	$122.8
Program Subtotal	***$474.6***	***$473.1***	***$473.1***	***$421.6***	***$421.6***
Admin/Research	$86.7	$86.9	$86.9	$75.8	$75.6
Public Info/Education	$140.0	$140.0	$140.0	$154.0	$154.0
TOTAL ANNUAL	**$701.3**	**$700.0**	**$700.0**	**$651.3**	**$651.1**

ES-6.4 Expected Savings

Table ES-10 summarizes projected annual water savings by customer class. By 2015 projected water savings are approximately 584 AF. Programs affecting residential water demands account for approximately three-fourths of these savings, while programs affecting non-residential demands account for one-fourth. Projected savings are expected to exceed both SBx7-7 and MOU Flex Track targets.

Table ES-10. Stockton District Projected Water Savings by Customer Class

	Annual Water Savings (AF)				
Customer Class	**2011**	**2012**	**2013**	**2014**	**2015**
Single Family	104.6	206.2	305.0	377.8	450.2
Multi Family	45.5	89.4	131.9	179.1	224.8
Commercial/Industrial	33.2	65.2	96.9	134.7	172.3
Large Landscape	9.5	12.5	15.5	26.4	27.5
Total Water Savings	**192.8**	**373.2**	**549.3**	**717.9**	**874.8**

Table ES-11 compares per capita water use under the recommended portfolio to that under the adjusted baseline and the MOU and SBx7-7 targets. Per capita use under the recommended portfolio is 168 gpcd, which is 4 gpcd less than the MOU Flex Track target and 6 gpcd less than the 2015 SBx7-7 target. Per capita demand will need to decrease an additional 3 gpcd between 2015 and 2020 in order to meet the 2020 SBx7-7 per capita target.

Table ES-11. Stockton District Recommended Portfolio Projected 2015 Demand

Demand Projection	Demand (GPCD)	Difference from Adjusted Baseline (GPCD)
Adjusted Baseline	173	
SBx7-7 Target	174	1
MOU Flex Track Target	172	0
Recommended Portfolio	168	-5

ES-7 Plan Monitoring and Updates

Cal Water will need to regularly review the plan and make adjustments to it as appropriate. Key monitoring and updating activities Cal Water anticipates undertaking following plan implementation include:

- Cal Water will assess and adopt conservation program tracking software to be used to track and manage its core and non-core programs.
- Cal Water will submit its initial filing for the 2014-16 GRC in July 2012. Prior to that filing, Cal Water may elect to update this plan to reflect new information and changed circumstances affecting the baseline water demands, calculated water savings targets, recommended conservation programs, projected water savings, and proposed conservation program budgets.
- Cal Water may, in conjunction with preparation of its 2015 Urban Water Management Plans, elect to update its baseline demand estimates and gpcd targets, if new information warrants doing so. Depending on the final methodology adopted by DWR for the as-yet unspecified fourth target calculation option, Cal Water may decide to update the SBx7-7 targets included in the plan using this alternative methodology.
- Cal Water may elect to update this plan to reflect a revised Flex Track target based on a CUWCC-sanctioned Flex Track target calculator, expected to be available in the first half of 2011.
- Results from studies, such as the one Cal Water and San Jose State University Research Foundation are jointly undertaking to better estimate realized water savings from converting customers from flat rate to metered billing, will be used by Cal Water to update water savings projections.
- Cal Water will work with local planning and enforcement departments to ensure that its conservation programs are consistent with and

complementary to local water use codes and ordinances, and may elect to modify the design or level of implementation of programs included in the plan in order to do so.

- Cal Water plans to update these plans no less frequently than every five years, in conjunction with the update and reporting cycle for the district-specific UWMPs. Plan updates may entail adjustment of existing programs and addition of new programs based on performance history, community input, and changes to state and local conservation requirements.

1 Introduction

1.1 Master Plan Scope and Objectives

California Water Service Company (Cal Water) is in the process of expanding current conservation programs and developing new programs for its 24 service districts. Over the next five years, Cal Water conservation program expenditures are likely to increase significantly. Recently adopted state policies requiring future reductions in per capita urban water use are providing much of the impetus for this effort. Primarily the passage of Senate Bill No. 7 (SBx7-7) in November 2009, which mandated a statewide 20% reduction in per capita urban water use by 2020, but also recent decisions by the California Public Utilities Commission (CPUC) directing Class A and B water utilities to adopt conservation programs and rate structures designed to achieve reductions in per capita water use, and the *Memorandum of Understanding Regarding Urban Water Conservation in California* (MOU), of which Cal Water has been a signatory since 1991. In addition, conservation will help to address local water supply constraints in some districts.

In preparing for this program expansion, Cal Water has spent the past year developing five-year conservation program plans for each of its service districts. Each district plan was developed with the following questions in mind:

- How much water conservation will each district need to implement in order to comply with state urban per capita water use targets?
- How much of this conservation requirement can be met by existing water efficiency codes and ordinances, scheduled increases in water rates, and past investment in conservation programs?
- How much of this conservation requirement will need to be met through new investments in conservation?
- Which water conservation programs at what levels of activity result in the most benefit to Cal Water ratepayers?
- Should existing programs be expanded, new programs developed, or both?
- How can conservation be used to help address local water supply constraints?
- How many conservation programs can Cal Water reasonably expect to operate given the geographic dispersion of its districts, available staffing and budgetary resources?

- How can regional partnerships be leveraged to more efficiently achieve a district's water conservation targets?

The primary objective of this planning process was the development of a set of comprehensive, service-area-specific conservation plans to guide Cal Water conservation program development and investment over the next five years. This report describes the five-year plan developed for the Stockton District.

1.2 Plan Development

Plan development proceeded in phases. The first phase focused on compiling data needed for projecting future district water demand, developing per capita water use targets, and analyzing conservation programs. The data collected during this phase is used extensively throughout this report and provides the foundation for the quantitative analyses used to develop the plan's per capita water use targets and conservation program recommendations.

The next phase of plan development centered on estimating the volume of water savings the district would need to achieve over the next five years in order to satisfy SBx7-7 and MOU interim compliance requirements. Once these volumes were determined, expected water savings from existing codes and ordinances, scheduled increases in water rates, and past conservation program activity were deducted in order to determine the amount of water savings that would need to come from new conservation programs.

Using the results of the second phase as a starting point, the third phase of plan development entailed a comprehensive assessment of conservation program concepts to identify the best mix of programs to achieve the required water savings. This included soliciting input on program concepts from community stakeholders, and passing a broad universe of conservation program concepts through qualitative and quantitative screens designed to eliminate program concepts that were not good matches for Cal Water districts. Program concepts making it through the screening process were further refined and used to develop a set of core and non-core conservation programs, where core programs are those that Cal Water will offer in every district over the next five years and non-core programs are those that Cal Water will offer in some districts as needed.

To complete the plan, the recommended annual levels of activity for core and non-core programs were developed for each district. Proposed district program activity levels were informed by several considerations, as follows:

- First, minimum and maximum levels of activity for each district were established, where the minimum level sets the point below which it would not be administratively feasible or cost-effective to offer the program in the district, and the maximum level sets the point above which additional program participation would be highly uncertain given current market

penetration and district experience.

- Second, the current CPUC General Rate Case (GRC) decision for Cal Water establishes each district's conservation budget for 2011-13 as well as the maximum amount of budget each district can allocate to residential and non-residential conservation programs. Thus, the proposed program activity levels are designed so as not to violate these budgetary constraints.

- Third, the proposed program activity levels seek to achieve each district's water use targets at lowest possible cost, subject to the activity level and budgetary constraints described above.

- Lastly, any program with a benefit-cost ratio greater than one was set to its maximum activity level in 2014 and 2015, since doing so would benefit ratepayers by lowering the average cost of water service.[3]

1.3 Report Organization

The organization of this plan closely follows the analytical process described above, and, in addition to this introduction, includes the following sections:

- *Section 2, District Profile*, provides a general overview of the Stockton District, including service area description, historical and projected population and service connections, historical water demand, projected water demand (without additional conservation), future water supply constraints and costs, projected water rates affecting future water use in the district.

- *Section 3, Statewide Urban Water Demand Reduction Policies*, describes the inter-related state-level policies and agreements aimed at reducing urban water use. These include: (1) recent decisions by the CPUC directing Class A and B water utilities to reduce per capita urban water demand; (2) state legislation mandating urban water suppliers to reduce per capita demand 20% by 2020; and (3) the Memorandum of Understanding Regarding Urban Water Conservation in California (MOU).

- *Section 4, Per Capita and MOU Savings Targets,* derives the reduction in demand required by 2015 in order for Stockton District to achieve interim compliance with SBx7-7 and the MOU.

- *Section 5, Water Savings Required from New Programs*, calculates the volume of water savings expected from existing water efficiency codes and

[3] This could not be done for 2011-13 because of the annual budget constraints resulting from the current General Rate Case (GRC).

ordinances, scheduled increases in water rates, and past investment in conservation programs in order to derive the amount of water savings that will be needed from new conservation program investment.

- *Section 6, Conservation Program Analysis*, describes the conservation program screening and quantitative analysis used to identify, evaluate and select conservation programs for Stockton District.

- *Section 7, Portfolio Development*, describes the process used to develop the recommended conservation program portfolio for Stockton District.

- *Section 8, Plan Monitoring and Updates*, describes how plan implementation will be monitored, discusses key uncertainties related to plan implementation, realization of projected water savings, and achieving the stated water savings targets, and how the plan will be updated as conditions change and new information on the effectiveness and cost of programs becomes available.

2 District Profile

2.1 Introduction

This part of the plan provides a general overview of the Stockton District, including service area description, historical and projected population and service connections, historical water demand, projected water demand (without additional conservation), future water supply constraints and costs, projected water rates affecting future water use in the district.

2.2 Service Area Description

The Stockton District is located in San Joaquin County approximately 45 miles south of Sacramento and 62 miles east of San Francisco. The district serves portions of the City of Stockton and adjacent unincorporated San Joaquin County. The community of French Camp is south of the district. The City of Stockton Water Department owns and operates water systems to the north, southwest, and southeast of the district. Figure 2-1 provides a map showing the district's service boundary.

On average, the district receives about 14 inches of rainfall annually, most of which falls in the late autumn, winter, and early spring. The late spring, summer, and early autumn months are generally dry. Annual evapotranspiration in the district averages 53 inches, which means that most landscapes cannot survive on rainfall alone and must be irrigated.[4] Water for landscape is a significant use during the summer months and drives the district's peak day and peak hour demands.

2.3 Population and Service Connections[5]

Stockton District's current population is approximately 163,000. District population has not grown over the previous ten years. Future growth is expected to be well under half a percent per year. By 2020, the district's population is projected to reach about 167,000, an increase of 2.5% from its 2010 level. Historical and projected population for the district is shown in Table 2-1.

[4] Evapostranspiration is a measure of the amount of water loss due to the combined effects of plant transpiration and evaporation from soil surface.

[5] The population and service connection projections in this section are based on the draft final projections for the district's 2011 UWMP. Because the final UWMP projections were not available during the development of this plan, the data in this section may differ slightly from the final projections contained in the 2011 UWMP update.

Figure 2-1. General Location of Stockton District

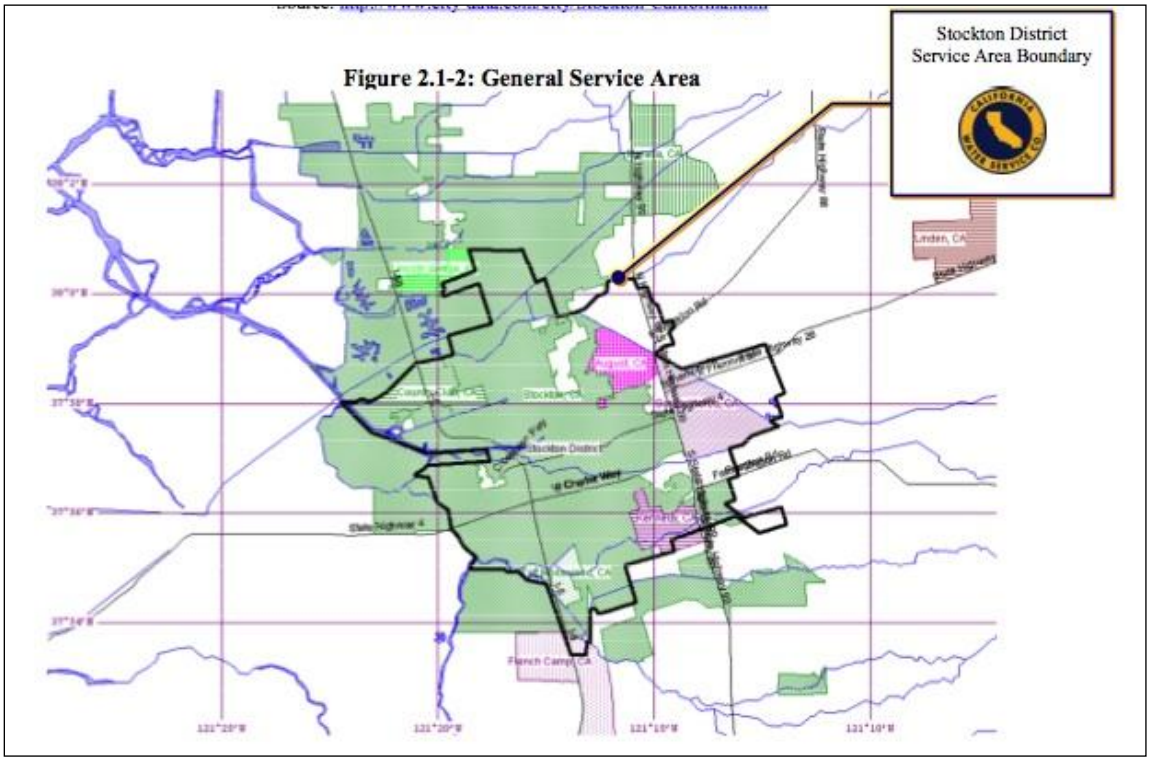


Table 2-1. Stockton District Historical and Projected Population

Historical		Projected	
Year	Population	Year	Population
1999	160,490	2010	162,860
2000	161,153	2011	163,340
2001	161,830	2012	163,720
2002	163,100	2013	164,100
2003	162,570	2014	164,480
2004	162,730	2015	164,860
2005	163,920	2016	165,250
2006	164,520	2017	165,630
2007	163,160	2018	166,020
2008	160,660	2019	166,410
2009	159,420	2020	166,810
Av. Ann. Growth Rate	-0.1%	Av. Ann. Growth Rate	0.2%

Stockton District primarily serves single-family households, which account for about 89% of total service connections. The distribution of services by customer type for 2009 is shown in Figure 2-2. Projected services through 2020 are shown Table 2-2.

Figure 2-2. Stockton District Distribution of Services by Customer Type

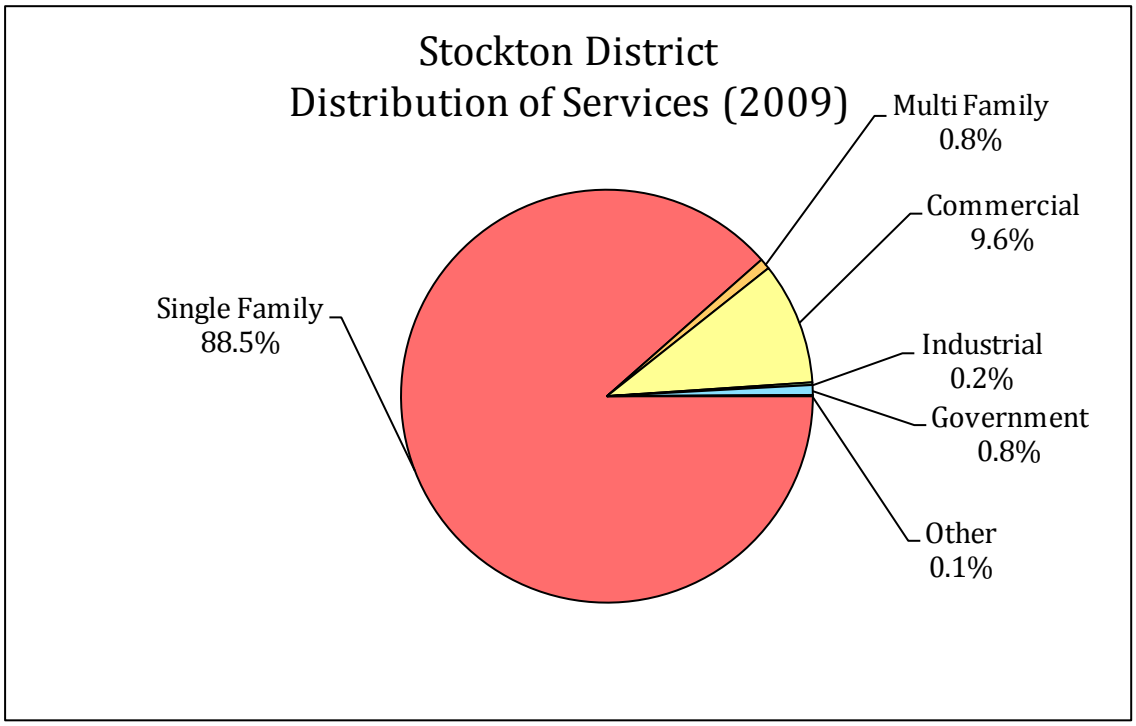


Table 2-2. Stockton District Service Connections

Customer Type	Projected Services 2010	Projected Services 2015	Projected Services 2020
Single Family Residential	36,669	36,704	36,739
Multi Family Residential	326	327	327
Commercial	4,007	4,024	4,041
Industrial	86	86	86
Government	308	309	309
Other	36	36	36
Total	**41,433**	**41,486**	**41,539**

2.4 Historical Water Demand

Since 2005, annual demand in the district has averaged about 32,000 AF. Historical demands by category are shown in Figure 2-3. Residential services currently account for about 55% of system demand. The district also has significant commercial and industrial uses, which account for about 29% of demand. Government and utility uses account for 9%, and unaccounted water losses account for the remaining 7%. The percent of total demand in 2009 by type of use is shown in Figure 2-4.

Figure 2-3. Stockton District Historical Demand

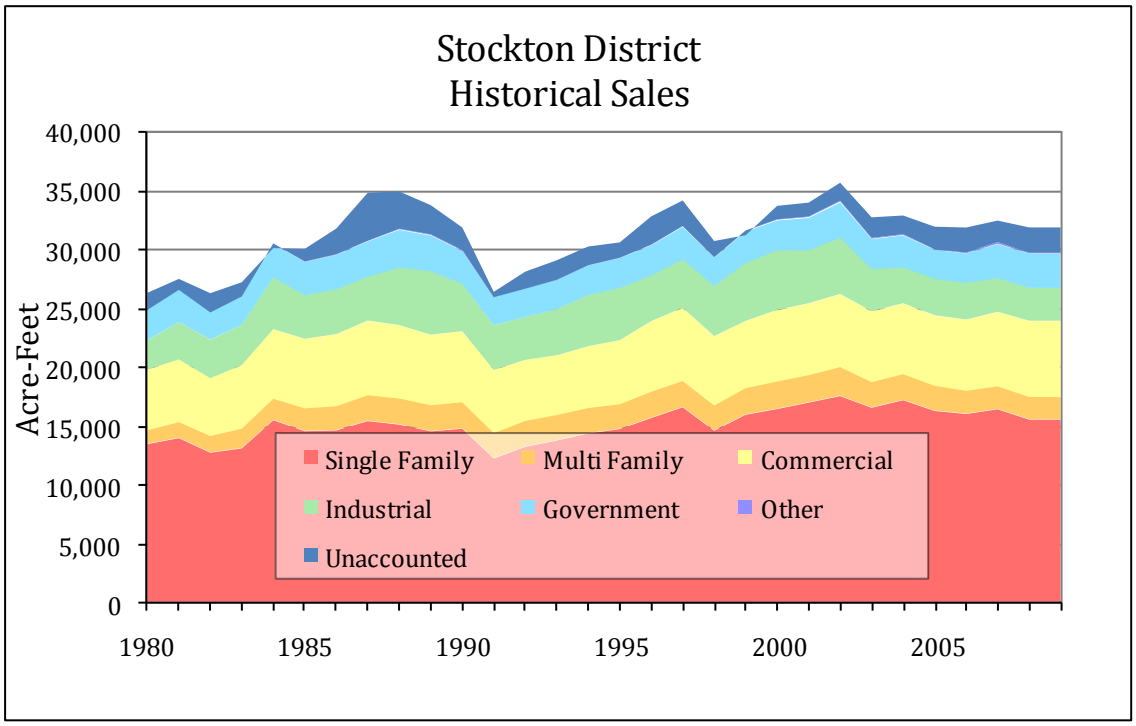
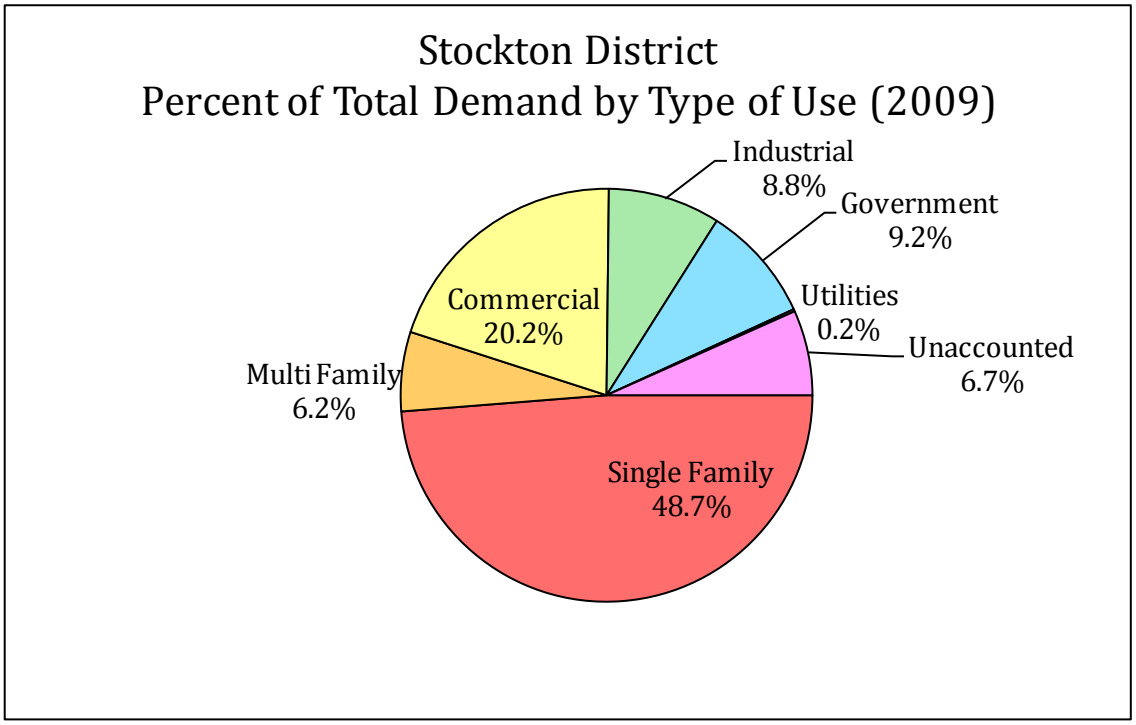
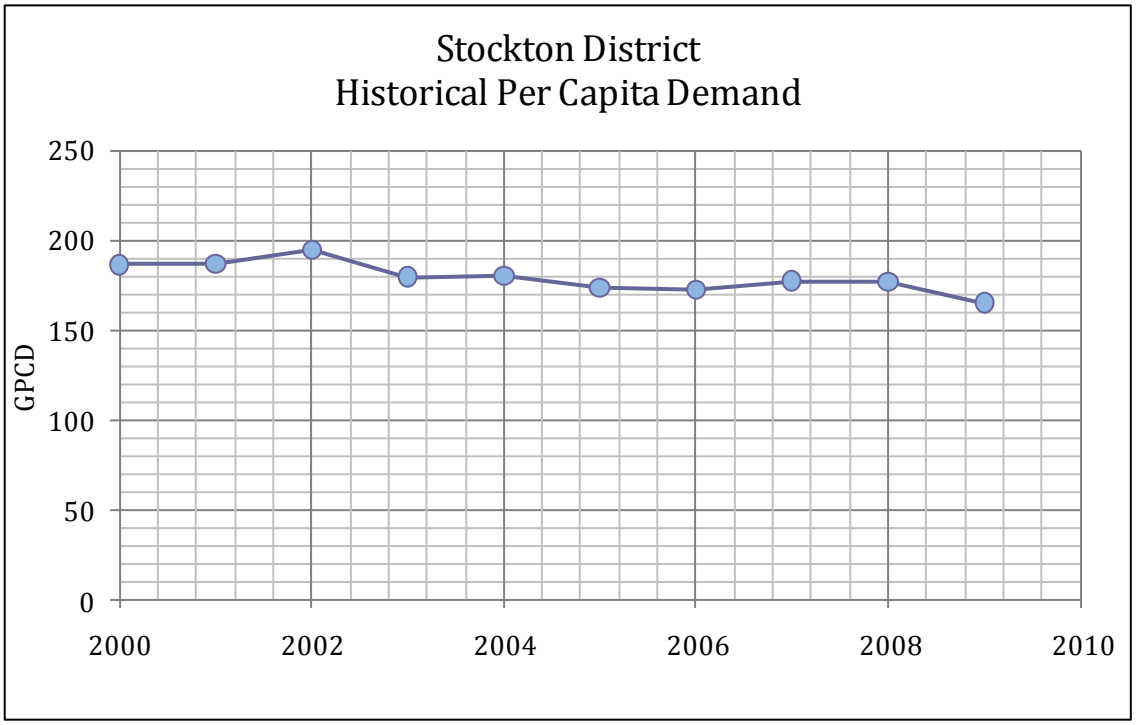


Figure 2-4. Stockton District Percent of Total Demand by Type of Use



Historical per capita demand is shown in Figure 2-5.[6] Per capita demand has trended down over the last decade. In the last five years, per capita demand has averaged 173 gallons per day. Per capita water use in the district is about 30% lower than average per capita use in the San Joaquin River hydrologic region, which the California Department of Water Resources (DWR) estimated at about 248 gallons per day. As discussed in Section 4, the district's relatively low per capita water use is expected to help it comply with state legislation passed in 2009 requiring urban water suppliers to reduce per capita water use by 20% by 2020.

Figure 2-5. Stockton District Historical Per Capita Demand



2.5 Unadjusted Baseline Water Demand Projection

The unadjusted baseline water demand projection equals the forecasted district population multiplied by 2005-09 average per capita water use. This shows expected future demand given current patterns of consumption and water use efficiency and expected population growth. Baseline projections are shown in Figure 2-6 and Table 2-3.

Historical demand excluding recycled water use is used to calculate the district's 2015 and 2020 per capita water use targets required under state law. These targets are then compared to the baseline demand projection to determine how much

[6] Per capita demand is the quotient of total demand across all customer classes and the district population.

potable water demands will need to adjust in order to achieve the targets. The derivation of these per capita targets and savings requirements are presented in Section 4.

Some of the required water saving are expected to come from plumbing fixture efficiency codes, changes in water rates, and past conservation program investment. These expected changes in demand need to be addressed in order to calculate the amount of savings that will need to come from new conservation investment. Expected changes in demand due to codes, rates, and past conservation investment are calculated in Section 5.

Figure 2-6. Stockton District Unadjusted Baseline Demand Projection

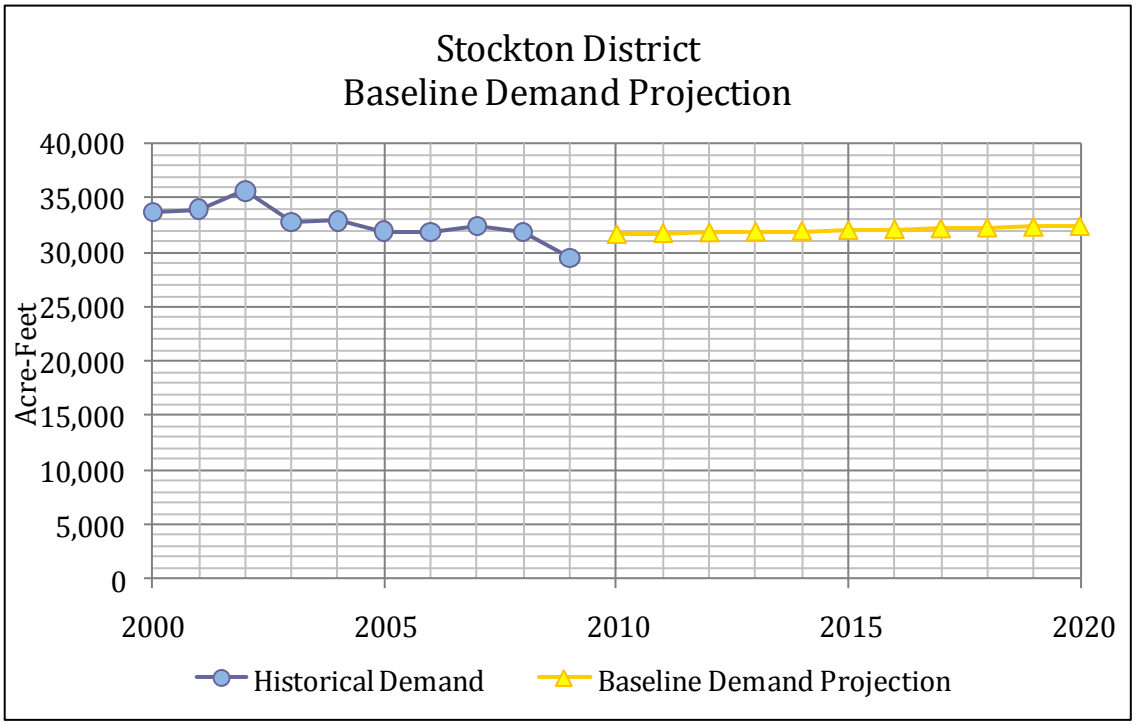


Table 2-3. Stockton District Unadjusted Baseline Demand Projection

Year	2010	2015	2020
Unadjusted Baseline Demand (AF)	31,648	32,036	32,415
Increase from 2010 (AF)	NA	389	768
Increase from 2010 (%)	NA	1.2%	2.4%

2.6 Local Water Supply Issues[7]

The water supply for the customers of the Stockton District is a combination of imported purchased water and groundwater. Purchased water currently provides approximately 65 percent of the District's water requirements as measured over the past five years. Purchased water is obtained by the Stockton East Water District (SEWD) from either the New Hogan Reservoir on the Calavaras River or the New Melones Reservoir on the Stanislaus River. SEWD has transfer agreements with the US Bureau of Reclamation (USBR) for water from both reservoirs and another shorter term transfer agreement with South San Joaquin Irrigation District (SSJID) and Oakdale Irrigation District (OID). Water from both sources is conveyed through an extensive conveyance system owned, operated, and maintained by SEWD. Raw water is treated at SEWD's treatment plant located on the eastern edge of the Stockton metropolitan area. Finished water is pumped from the plant via transmission mains to Cal Water, the City of Stockton, and San Joaquin County. San Joaquin County has two separate maintenance districts (Lincoln Village Maintenance District and Colonial Heights Maintenance District) within the City of Stockton that are also served by the plant.

Each purveyor's share of SEWD plant output for a new water year is based on the percentage that its prior year water production is in relation to the total water production for all purveyors in the Stockton Metropolitan area. The allocation method for SEWD plant output is specified in what is referred to as the Second Amended Contract which was signed by all parties. Growth in the City of Stockton's service area in the last 10 years has been and continues to be at a faster rate than in Cal Water's service area. As a consequence, Cal Water's share of SEWD treatment plant output is projected to continue to decline in the future unless the Second Amended Contract is changed. It is projected using recent comparative growth rates for the City and Cal Water service areas that Cal Water will get only 41 percent of SEWD output in 2010 and 29 percent in 2020 if this trend continues. An offset to this loss is the planned expansion of the SEWD plant capacity. Current SEWD treatment plant design capacity is 50 mgd (56,054 AFY) with short term peaking capacity at 60 mgd. SEWD's Long Term Water Supply Study is examining the feasibility of expanding the treatment plant to a capacity of 72 mgd. Near future plans are to expand the plant to a base load capacity of 72 mgd (80,650 AFY) with a pumping peaking capacity of 94 mgd. Cal Water is currently in negotiations with all the parties that receive treated water from SEWD to develop a new method for allocating deliveries from the WTP. Cal Water expects these negotiations to result in a firm supply of approximately 48 percent of the total available water from the SEWD WTP.

The Stockton District plans on maximizing the use of SEWD purchased treated surface water to meet year round demands. During summer months when customer demands are greatest, it augments the SEWD supply by pumping groundwater. Use

[7] The district's 2010 Urban Water Management Plan provides a detailed discussion of district water supply sources and water supply management issues.

of SEWD imported surface supplies in this manner contributes to reducing overdraft of the San Joaquin groundwater basin in the Stockton area. Groundwater overdraft conditions have existed in the San Joaquin Valley Basin since the 1920's. Major groundwater extractions around Stockton have caused a greater-than-average rate of decline. In the 1950's, groundwater elevations in this vicinity fell below sea level. DWR estimates the annual overdraft from this subbasin at 70,000 AF. Average static groundwater elevation records maintained since 1940 indicate a gradual yet constant decline caused by regional overdraft conditions. A common objective of Cal Water, the City of Stockton Municipal Utilities District (COSMUD), and San Joaquin County is to reduce groundwater overdraft and protect the groundwater basin from further saline intrusions and water quality degradation. To that end, COSMUD made a conservative assumption for groundwater extraction to insure that in the long-term groundwater basin storage is adequately maintained, if not enhanced, and therefore has adopted a 0.60 acre-ft/acre/year factor for supply planning purposes. Cal Water views an average groundwater long term withdrawal rate of 0.60 acre-ft/acre/year as a conservative goal and will assess future use of groundwater in its service area based on that goal with the understanding that it may use a higher withdrawal rate if future circumstances warrant it, such as, drought conditions in which imported water is curtailed. The 2000 to 2006 average withdrawal rate was 0.54 acre-ft/acre/year for the District.

2.7 Future Water Cost

As will be discussed below in Section 6, a key component of the analysis of potential water conservation programs for each district is a forecast of the district's future avoided costs of water supplies and infrastructure. Each unit of water conservation provides an economic benefit to the water utility by allowing the agency to avoid certain supply and/or infrastructure costs.

The avoided cost for each Cal Water district was estimated using the CUWCC/Water Research Foundation Avoided Cost Model. The model estimates the costs that the water utility will avoid as a result of each acre foot of water conserved. The model estimates both short run and long run avoided costs, and differentiates between water saved in the peak and off-peak seasons.[8] Following is a description of how the avoided costs were estimated for Stockton District.

2.7.1 Short-Run Avoided Costs

As water conservation programs reduce demand, less water must be purchased, produced, pumped, and/or treated. These reduced variable operating costs constitute the short-run avoided costs. To estimate the short-run avoided costs per acre-foot of reduced demand, the supplies and/or facilities that will be cut back in response to conservation-induced demand reductions (the so-called "marginal" supplies and facilities) must be identified. In the case of Stockton District, the marginal supply is well water.

[8] The peak season is separately specified for each district depending on district supply and demand characteristics. For Stockton District, the peak season includes the months of June-September.

The avoidable cost components for each acre-foot of supply provided by this source, and the rate at which those costs are expected to escalate in the future, were then estimated. Avoided cost components include power and chemical costs.

2.7.2 Long-Run Avoided Costs

In addition to the immediate reduction in variable operating costs, peak-season demand reductions may, in the long run, also enable a water supplier to defer or downsize planned future capital investments in supply and/or infrastructure capacity. For Stockton District, one such project was identified. This project was deemed to be deferrable in response to conservation-induced demand reductions. Thus, beginning in 2016, and based on this project's estimated annualized capital and fixed operating costs, Stockton District's avoided costs will also include a long-run component.

Table 2-4 summarizes the Stockton District avoided cost forecast.

Table 2-4. Stockton District Avoided Cost Forecast

Avoided Cost ($/AF)	2010	2020	2030	2040
Short-Run	$175	$175	$175	$175
Long-Run[1]	$0	$904	$742	$0
TOTAL	$175	$1,079	$917	$175

[1] Long-Run costs are avoided only as a result of reductions in peak-season demand.

2.8 Future Water Rates

Water service rates in the district are regulated by the California Public Utilities Commission (CPUC). The district files a General Rate Case with the CPUC every three years. The CPUC uses the information provided in the rate case to set rates so that the district can recover the cost of service and earn a reasonable return on its investments in the water system. The last rate case was concluded in 2010 and established rates for 2011, 2012, and 2013. The percentage increase in service rates over the prior year is shown in Table 2-5.[9] These rate changes are incorporated into the analysis of future demand and net water saving requirements, as described in Section 5 of the plan.[10]

[9]More precisely, the increases for 2012 and 2013 show the percentage change in district revenue requirement, which may be slightly different than the percentage change in the average rate, but provide a close proxy for the expected change in volumetric rates.

[10] The percentage increases shown in the table do not include possible increases in purchased water costs that would be passed through to customer bills. Thus, the change in customer rates could turn out to be greater than suggested by the table in districts, such as Stockton, purchasing water from regional wholesalers.

Table 2-5. Stockton District Nominal Change in Service Rates

Year	**2011**	**2012**	**2013**
Change from Prior Year	7.6%	0.3%	0.3%

3 Statewide Urban Water Demand Reduction Policies

3.1 Introduction

Inter-related state-level policies and agreements aimed at reducing urban water use have provided much of the impetus for this plan. These include: (1) recent decisions by the California Public Utilities Commission (CPUC) directing Class A and B water utilities to reduce per capita urban water demand; (2) state legislation mandating urban water suppliers to reduce per capita demand 20% by 2020; and (3) the Memorandum of Understanding Regarding Urban Water Conservation in California (MOU). This section of the plan discusses these requirements, their relationship to one another, and their relationship to Cal Water's overall conservation strategy.

3.2 CPUC GPCD Policy

The CPUC's Decision 07-05-062 directed Class A and B water utilities to submit a plan to achieve a 5% reduction in average customer water use over each three-year rate cycle. This policy was refined under Decision 08-02-036, which established a water use reduction goal of 3% to 6% in per customer or service connection consumption every three years once a full conservation program, with price and non-price components, is in place. These decisions anticipated enactment of policies by the State legislature to reduce urban water use in California 20% by 2020.

3.3 State Per Capita Water Use Policies and Targets

Senate Bill 7 (SBx7-7), which was signed into law in November 2009, amended the State Water Code to require a 20% reduction in urban per capita water use by 2020. Commonly known as the 20x2020 policy, the new requirements apply to every retail urban water supplier subject to the Urban Water Management Planning Act (UWMPA).[11]

3.3.1 SBx7-7 GPCD Reduction Targets

SBx7-7 requires the state to achieve a 20% reduction in urban per capita water use by December 31, 2020. The state is required to make incremental progress toward this goal by reducing per capita water use by at least 10% on or before December 31, 2015. SBx7-7 requires each urban retail water supplier to develop interim and 2020 urban water use targets in accordance with specific requirements described below. Urban retail water suppliers will not be eligible for state water grants or loans unless they comply with SBx7-7's requirements.

[11] Cal Water prepares separate urban water management plans for each of its service districts and updates these plans every five years. Starting in 2011, districts submitting urban water management plans to the state are required, under SBx7-7, to document their interim and 2020 gpcd targets and compliance daily water use.

Under SBx7-7, an urban retail water supplier may adopt one of four different methods for determining the 2020 gpcd target:

1. Set the 2020 target to 80% of average GPCD for any continuous 10-year period ending no earlier than December 31, 2004, and no later than December 31, 2010.[12]

2. Set the 2020 target as the sum of the following:

    a. 55 GPCD for indoor residential water use

    b. 90% of baseline CII water uses, where baseline CII GPCD equals the average for any contiguous 10-year period ending no earlier than December 31, 2004, and no later than December 31, 2010.

    c. Estimated per capita landscape water use for landscape irrigated through residential and dedicated irrigation meters assuming water use efficiency equivalent to the standards of the Model Water Efficient Landscape Ordinance set forth in Section 2.7 of Division 2 of Title 23 of the California Code of Regulations.[13]

3. Set the 2020 target to 95% of the applicable state hydrologic region[14] target, as set forth in the state's draft 20x2020 Water Conservation Plan (dated April 30, 2009).

4. A method as yet unspecified, to be determined by DWR no later than December 31, 2010.

Additionally, if baseline GPCD is greater than 100 gallons, the 2020 GPCD target can be no greater than 95% of average GPCD calculated over a continuous 5-year period ending no earlier than December 31, 2007 and no later than December 31, 2010, irrespective of the target method adopted.

3.3.2 Regional Compliance

SBx7-7 allows water suppliers to form regional alliances and set regional targets for purposes of compliance. Under the regional compliance approach, water suppliers within the same hydrologic region can comply with SBx7-7 by either meeting their

[12] If the supplier meets at least 10% of its retail demand with recycled water, it may extend the period for calculating average baseline GPCD by up to an additional five years.
[13] This method requires the use of satellite imagery, site visits, or other best available technology to develop an accurate estimate of landscaped areas served by residential and dedicated irrigation meters.
[14] California is divided into 10 hydrologic regions. A map of these regions can be viewed at: www.water.ca.gov/floodmgmt/hafoo/csc/.

individual target or being part of a regional alliance that meets its regional target.[15] The regional target is calculated as the population-weighted average target for the water suppliers comprising the regional alliance.

Importantly, being part of a regional alliance does not preclude a water supplier from complying with SBx7-7 by meeting its individual target. A water supplier that is part of a regional alliance will not comply with SBx7-7 only if the regional alliance fails to meet the regional target and the water supplier fails to meet its individual target. This provision of SBx7-7 effectively gives a water supplier that is part of a regional alliance two ways to comply. Cal Water districts sorted by hydrologic region are shown in Table 3-1. Because Stockton District is the only Cal Water district in the San Joaquin River hydrologic region, regional compliance is not an option for it.

Table 3-1. Cal Water Districts Sorted by Hydrologic Region

Hydrologic Region	**Cal Water Districts in Region**
North Coast	Redwood Valley
San Francisco Bay Area	Bear Gulch, Livermore, Los Altos, Mid-Peninsula, South San Francisco
Central Coast	King City, Salinas
South Coast	Domiguez, East LA, Hermosa-Redondo, Palos Verdes, Westlake
Sacramento River	Chico, Dixon, Marysville, Oroville, Willows
San Joaquin River	**Stockton**
Tulare Lake	Bakersfield, Kern River Valley, Selma, Visalia
North Lahontan	None
South Lahontan	Antelope Valley
Colorado River	None

3.3.3 Cal Water SBx7-7 Compliance Strategy

Cal Water's SBx7-7 compliance strategy involves:

1. Identifying for each district the largest allowable interim and 2020 GPCD targets under methods 1 and 3;[16]

2. Grouping districts by hydrologic region and calculating population-weighted regional targets where applicable; and

[15] Water suppliers may also form regional alliances if they are served by the same wholesale water supplier, they are members of a regional agency authorized to plan and implement water conservation, or they are part of an integrated regional water management funding area.
[16] Targets based on method 2 were not considered because the data necessary to accurately estimate landscape areas served by residential and dedicated irrigation meters was not available. Method 4 had not been defined at the time this plan was developed.

3. Developing conservation programs aimed at achieving the regional and/or district-specific targets.

The resulting SBx7-7 targets and required water demand reductions for Stockton District are presented in Section 4 of the plan. It is important to emphasize that SBx7-7 is just one of several factors used to determine the Plan's recommended level of water savings. Other factors included MOU compliance, cost-effectiveness, and district water supply and quality considerations.

3.4 Urban Water Conservation MOU

The MOU has guided urban water conservation programs in California since it was first adopted in 1991. More than 230 California urban water suppliers have signed the MOU and pledged good faith efforts to comply with its terms. Most urban water conservation programs operated by California water utilities have been shaped to some extent by MOU requirements. While compliance with the MOU is voluntary, access to some types of state funding for water resources management is conditioned on MOU compliance.[17] These eligibility requirements will end July 1, 2016. After that date, access to state funding for water resources management will be conditioned on compliance with SBx7-7 requirements.

3.4.1 MOU Compliance Options

There are three ways in which a water supplier can comply with the MOU. The first way is to implement a set of water conservation best management practices (BMPs) according to the requirements and schedules set forth in Exhibit 1 of the MOU. The second way, called Flex Track compliance, is to implement conservation programs expected to save an equivalent or greater volume of water than the BMPs. The third way, similar to SBx7-7, is to reduce per capita water use. Each of these compliance options is briefly described below.

BMP Implementation Compliance

Originally, the MOU established a set of BMPs that signatories agreed to implement in good faith. For each BMP, the MOU established the actions required by the water supplier (e.g. site surveys, fixture and appliance rebates, water use budgets, volumetric pricing and conservation rate designs), the implementation schedule, and the required level of effort (in the MOU this is referred to as the coverage requirement). Additionally, the MOU established the terms by which a water supplier could opt out of implementing a BMP.

BMPs are grouped into five categories. Two categories, Utility Operations and Education, are "Foundational BMPs" because they are considered to be essential water conservation activities by any utility and are adopted for implementation by all signatories to the MOU as ongoing practices with no time limits. The remaining BMPs are "Programmatic BMPs" and are organized into Residential, Commercial, Industrial, and Institutional (CII), and Landscape categories.

[17] Section 10631.5 of the California Water Code.

Table 3-2 shows the BMPs by category. The requirements and coverage levels of each BMP are set forth in Exhibit 1 of the MOU.

Flex Track Compliance

Under Flex Track, a water supplier can estimate the expected water savings over the 10-year period 2009-2018 if it were to implement the programmatic BMPs in accordance with the MOU's schedule, coverage, and exemption requirements, and then achieve these water savings through any combination of programs it desires.[18] Thus, through the Flex Track compliance option, a water supplier agrees to save a certain volume of water using whatever it determines to be the best combination of programs. Because the savings target depends on the programmatic BMP coverage requirements, which in turn are functions of service area size and composition of demand, the volume of water to be saved under this compliance option must be calculated separately for each supplier. The methodologies and tools for water suppliers to implement these calculations are still being developed by the CUWCC.

GPCD Compliance

Under the GPCD option, a water supplier can comply with the MOU by reducing its baseline GPCD by 18% by 2018. The baseline is the ten-year period 1997-2006. The MOU also establishes interim GPCD targets and the highest acceptable levels of water use deemed to be in compliance with this option. The MOU's GPCD option is similar to using Method 1 to set the SBx7-7 target, except that it uses a fixed baseline period and only runs through 2018. This compliance option may be difficult to achieve for Cal Water districts that are part of a regional alliance for purposes of SBx7-7 compliance because savings as a percent of demand will vary considerably among the districts in the alliance. It may also conflict with district-specific SBx7-7 targets set using method 3 (hydrologic region-based target). Because of these potential conflicts, this is not considered a viable MOU compliance option for Cal Water districts.

3.4.2 Cal Water MOU Compliance Strategy

Cal Water plans to use Flex Track to comply with the MOU. This compliance option affords the most flexibility in selecting conservation programs suited to each Cal Water district and allows for more streamlined reporting. Because CUWCC tools for calculating a district's Flex Track savings target are not yet available, Cal Water developed its own target estimates for planning purposes, as described in Section 4. Cal Water will update these estimates as necessary following the release of the CUWCC Flex Track target calculator.

[18] The supplier is required to implement the foundational BMPs regardless of which compliance option it selects.

Table 3-2. MOU Best Management Practices

BMP Group	BMP Name
1. Utility Operations Programs (F)	Conservation Coordinator
	Water Waste Prevention
	Wholesale Agency Assistance Programs
	Water Loss Control
	Metering & Volumetric Rates
	Retail Conservation Pricing
2. Education Programs (F)	Public Information Programs
	School Education Programs
3. Residential (P)	Residential Assistance Program
	Landscape Water Surveys
	High Efficiency Clothes Washer Program
	Watersense Toilet Program
	Watersense Specifications for Residential Development
4. Commercial, Industrial, Institutional (P)	Reduce baseline CII water use by 10% in 10 years
5. Landscape (P)	Large Landscape Water Budget Programs
	Large Landscape Water Surveys

F = Foundational BMP, P = Programmatic BMP
BMP definitions, coverage requirements, and schedule of implementation are contained in the MOU (www.cuwcc.org).

4 SBx7-7 and MOU Savings Targets

4.1 Introduction

This section of the plan presents the SBx7-7 and MOU compliance targets for Stockton District. For district-specific SBx7-7 compliance, targets were set to either 80% of baseline GPCD or 95% of the district's hydrologic region target, whichever was greater. For MOU compliance, the Flex Track target was calculated as the volume of expected water savings from cost-effective programmatic BMPs over the 10-year period 2009 - 2018.

4.2 SBx7-7 Target Calculation

Table 4-1 shows the SBx7-7 target calculation for Stockton District. This table shows: (1) the maximum allowable target under SBx7-7, (2) the target based on Method 1 – 80% of baseline water use, (3) the target based on Method 3 – 95% of the hydrologic region target, and (4) the selected target for the district.

Maximum Allowable Target

As described in Section 3, the SBx7-7 target for 2020 cannot exceed 95% of the district's five-year baseline water use, where the baseline period ends no earlier than December 31, 2007 and no later than December 31, 2010. The district's 2020 target cannot exceed this level, regardless of which method is used to calculate it. In the case of Stockton District, neither target calculation method results in a target exceeding the maximum allowable target, so no adjustment is necessary.

Method 1 Target

Under Method 1, the 2015 and 2020 targets are set to 90% and 80% of baseline water use, respectively. Baseline water use is the average water use for any continuous 10-year period ending between 2004 and 2010. For Stockton District, the 10-year base period 1996-2005 yielded the maximum target under this method. The 2015 target is 164 gpcd and a 2020 target is 146 gpcd.

Method 3 Target

Under Method 3, the 2015 and 2020 targets are set to 95% of the 2015 and 2020 targets for the hydrologic region in which the district is located. Stockton District is located in the San Joaquin River hydrologic region. The 2015 target is 174 gpcd and the 2020 target is 165 gpcd.

Selected District Target

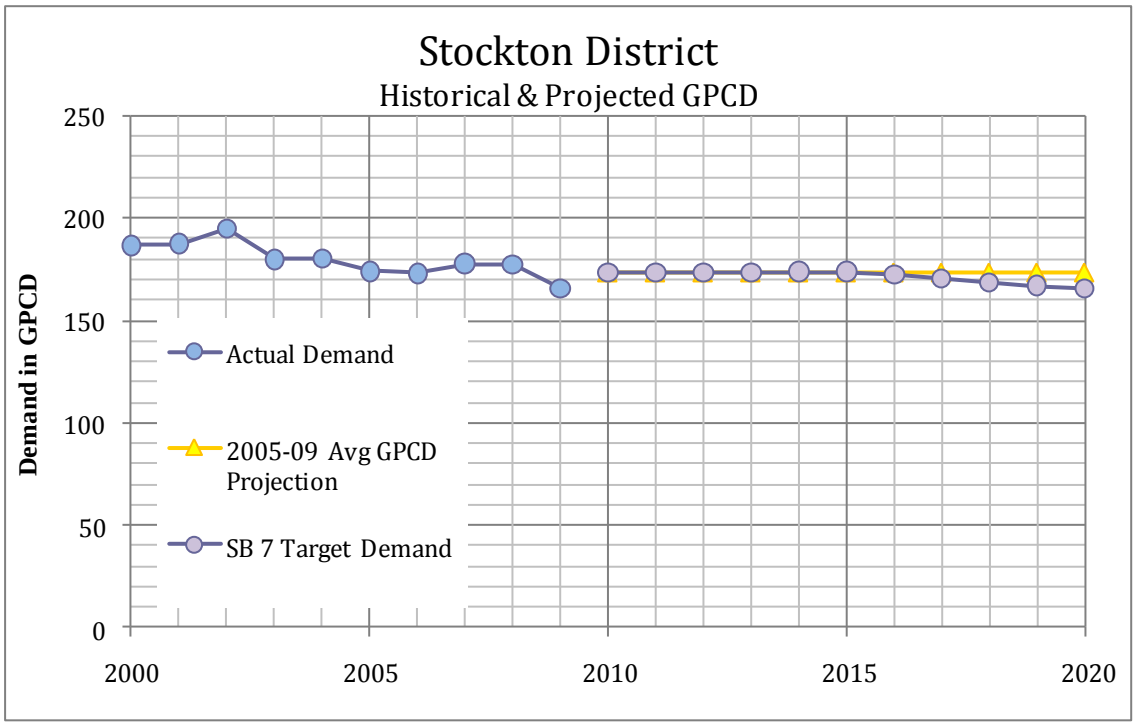
For Stockton District, SBx7-7 non-compliance risk is minimized by selecting the Method 3 targets. Figure 4-1 shows projected per capita demand based on the last five-years of district sales data and how it would need to change in order to meet the SBx7-7 targets. Average per capita use over the last five years is equal to the district's 2015 target. Per capita use will need to decrease an additional 5% by 2020 in order to satisfy the district's 2020 per capita water use target.

Table 4-1. Stockton District SBx7-7 GPCD Targets

Maximum Allowable Target (GPCD)	
Base Period:	2003-2007
Per Capita Water Use:	177
Maximum Allowable 2020 Target:	168
Method 1: 80% of Baseline Per Capita Daily Water Use (GPCD)	
Base Period:	1996-2005
Per Capita Water Use:	182
2015 Target:	164
2020 Target:	146
Method 3: 95% of Hydrologic Region Target (GPCD)	
Hydrologic Region:	SJ River
2015 Target[1]:	174
2020 Target:	165
Selected District Target (GPCD)	
2015 Target:	174
2020 Target:	165

[1]The 2015 Method 3 target is calculated as the mid-point between the district's base per capita water use and its 2020 target.

Figure 4-1. Stockton District SBx7-7 Per Capita Target Demand



4.3 MOU Flex Track Target Calculation

As discussed in Section 3, because CUWCC tools for calculating a district's Flex Track savings target are not yet available, Cal Water developed its own target estimates for planning purposes. The targets are based on the expected water savings from cost-effective programmatic BMPs over the ten-year period 2009-2018. The coverage requirements for the programmatic BMPs listed in Table 4-2 were used to calculate the Flex Track targets. Expected water savings and cost-effectiveness were based on the conservation program specifications presented in Section 6 and avoided water supply costs presented in Section 2. The resulting 2015 Flex Track target for Stockton District is shown in Table 4-3.

Table 4-2. Programmatic BMPs Used to Calculate Flex Track Target

BMP No.	Coverage Requirement Used to Calculate Water Savings
3.1 *Residential Assistance*	Provide leak detection assistance to an average of 1.5 percent per year of current single-family accounts and 1.5 percent per year of current multi-family units during the first ten years after signing the MOU. After completing the ten-year 15 percent target, agencies will maintain a program at the level of high-bill complaints or not less than 0.75 percent per year of current single-family accounts and 0.75 percent per year of current multi-family units. Showerhead distribution will be considered complete when 75 percent market saturation is achieved.
3.2 *Landscape Water Surveys*	Provide landscape water surveys to an average of 1.5 percent per year of current single-family accounts during the first ten years after signing the MOU. After completing the ten-year 15 percent target, agencies will maintain a program at the level of high-bill complaints or no less than 0.75 percent per year of current single-family accounts.
3.3 *High Efficiency Clothes Washer Incentives*	Provide financial incentives for the purchase of HECWs that meet an average water factor value of 5.0. If the WaterSense Specification is less than 5.0, then the water factor value will decrease to that amount. Incentives shall be provided to 0.9 percent of current single-family accounts during the first reporting period following BMP implementation, rising to 1.0 percent per year of current single-family accounts for the remainder of ten year period following signing of the MOU. An alternative method is to demonstrate 1.4 percent per year of the market penetration during the first ten years after signing the MOU.
3.4 *WSS Toilet Incentives*	A financial incentive shall continue to be offered for toilets meeting the current WSS and updated standard whenever a more efficient toilet is identified by WSS. Compliance will entail demonstrating a number of toilet replacements of 3.5 gpf or greater, toilets at or above the level achieved through a retrofit on resale ordinance until 2014, or a market saturation of 75% is demonstrated, whichever is sooner.
4.0 *CII Water Use Reduction*	Implement measures to achieve the water savings goal for CII accounts of 10% of the baseline water use over a 10-year period. Baseline water use is defined as the water consumed by CII accounts in the agency's service area in 2008. Credit for prior activities, as reported through the BMP database, will be given for up to 50% of the goal; in this case, coverage will consist of reducing annual water use by CII accounts by an amount equal to the adjusted percentage goal within 10 years.
5.1 *Dedicated Irrigation Account Budgets*	ETo-based water use budgets developed for 90% of CII accounts with dedicated irrigation meters at an average rate of 9% per year over 10 years.
5.2 *Non Residential Landscape Surveys*	Complete irrigation water use surveys for not less than 15% of CII accounts with mixed-use meters and un-metered accounts within 10 years of the date implementation is to commence. (Note: CII surveys that include both indoor and outdoor components can be credited against coverage requirements for both the Landscape and CII BMPs.)

Table 4-3. Stockton District 2015 MOU Flex Track Target

BMP	2015 Savings at Full Coverage	Cost-Effective[1]	2015 Target Contribution
BMP 3.1 Residential Assistance Savings - Single Family	33.8 AF	FALSE	0.0 AF
BMP 3.1Residential Assistance Savings - Multi Family	6.2 AF	FALSE	0.0 AF
BMP 3.2 Landscape Surveys - Single Family	41.5 AF	FALSE	0.0 AF
BMP 3.3 High Efficiency Clothes Washers	54.2 AF	FALSE	0.0 AF
BMP 3.4 WSS Toilets - Single Family	229.3 AF	FALSE	0.0 AF
BMP 3.4 WSS Toilets - Multi Family	37.8 AF	TRUE	37.8 AF
BMP 4.0 CII Reduction	852.9 AF	88.1 AF	88.1 AF
BMP 5.1 Dedicated Irrigation Account Budgets[2]	0.0 AF	NA	NA
BMP 5.2 Non Residential Landscape Surveys	46.9 AF	FALSE	0.0 AF
2015 Flex Track Target	1302.6 AF		126.0 AF

[1]True or false, except BMP 4.0 CII Reduction, which shows the calculated volume of cost-effective CII water savings based on the conservation program analysis presented in Section 6. Cost-effectiveness based on avoided water supply costs presented in Section 2 and the conservation program savings and cost assumptions presented in Section 6.

[2]District does not have dedicated irrigation accounts.

4.4 Difference from Unadjusted Baseline Water Use

The differences between the unadjusted baseline demand, district-specific SBx7-7 target, and MOU Flex Track target are shown in Table 4-4. This shows the maximum amount of water savings needed for SBx7-7 compliance, as well as the savings required for MOU compliance. In the case of Stockton District, the unadjusted baseline demand in 2015 is less than the SBx7-7 target demand by 71 AF, but greater than the MOU Flex Track target demand by 126 AF. Thus no additional water savings is required to meet the 2015 SBx7-7 target. As will be discussed in the next section, some of water savings needed to achieve MOU compliance will come from previous conservation program investment. Any residual will need to come from new conservation program activity, as will be addressed in Sections 6 and 7 of the plan.

Table 4-4. Stockton District Gross Savings Required for SBx7-7 and MOU Compliances

Gross Water Savings Required by 2015	SBx7-7	MOU Flex Track
2015 Unadjusted Baseline Demand	32,036 AF	32,036 AF
2015 Target Demand	32,107 AF	31,910 AF
Gross Savings Requirement	**-71 AF**	**126 AF**

5 Water Savings Required from New Programs

5.1 Introduction

In Section 4 the gross water savings Stockton District needs to realize by 2015 in order to satisfy SBx7-7 and MOU compliance requirements were presented. In this section, the volume of water savings that can reasonably be expected from existing efficiency codes, water rate adjustments, and past conservation program implementation is considered. The results are used to adjust baseline demand so that the volume of water savings that will need to come from new conservation programs can be determined.

5.2 Expected Savings from Efficiency Codes

Two recent California laws are expected to accelerate the replacement of low efficiency plumbing fixtures – primarily toilets and showerheads – with higher efficiency alternatives. [19]

- AB 715, passed in 2007, amended the California Building and Safety Code to require by January 1, 2014, that toilets sold or installed in California use no more than 1.28 gallons per flush.[20] It also requires that urinals sold or installed use no more than 0.5 gallons per flush.[21]

- SB 407, passed in 2009, amended the California Civil Code to require replacement of low efficiency plumbing fixtures with higher efficiency alternatives when a property undergoes alterations, improvements, or transfer.[22] In the case of single-family residential properties, issuance of a certificate of final completion and occupancy or final permit approval by the local building department for building alterations or improvements will be conditional on the replacement of low efficiency plumbing fixtures beginning in 2014. Single-family property owners are required by law to replace any remaining non-compliant plumbing fixtures by no later than January 1, 2017.

[19] Cities and counties also are required, under AB 1881, to adopt water efficient landscape design ordinances at least as effective as the state's model landscape ordinance. The extent and variability of landscape water use in the service area, as well as uncertain enforcement of ordinance requirements by the relevant city or county, make projections of potential water savings highly uncertain and therefore they are not incorporated into the forecast of potential water savings from efficiency codes.

[20] State law currently prohibits the sale and installation of toilets using more than 1.6 gallons per flush.

[21] State law currently prohibits the sale and installation of urinals using more than 1.0 gallon per flush.

[22] Non compliant plumbing fixtures include any toilet manufactured to use more than 1.6 gallons per flush, any showerhead manufactured to have a flow capacity more than 2.5 gallons per minute, and any interior faucet that emits more than 2.2 gallons per minute. Compliant water conserving plumbing fixtures means any fixture that is in compliance with current building standards applicable to a newly constructed real property of the same type.

> After this date, a seller or transferor of single-family residential real property must disclose in writing to the prospective purchaser or transferee whether the property includes any noncompliant plumbing fixtures. For multi-family and commercial properties non-compliant fixtures must be replaced by January 1, 2019. As with single-family properties, final permits or approvals for alterations or improvements are conditional on the replacement of low efficiency fixtures beginning in 2014.[23]

The phase-in dates for AB 715 and SB 407 mean they will not greatly contribute to meeting the 2015 interim GPCD target under SBx7-7. But they will support meeting the 2020 target. Moreover, since the early 1990's, the sale and installation of toilets manufactured to flush more than 1.6 gallons, showerheads manufactured to have a flow capacity more than 2.5 gallons per minute, and interior faucets manufactured to emit more than 2.2 gallons per minute has been prohibited. These requirements will continue to improve the efficiency of plumbing fixtures in older residential and commercial buildings.

Expected code-driven water savings for the period 2011-2015 are shown in Table 5-1. These estimates incorporate existing plumbing code requirements, as well as the full phase-in of AB 715 requirements starting in 2014.

Table 5-1. Stockton District 2011-2015 Code-Driven Water Savings

Code-Driven Water Savings (AF)	2011	2012	2013	2014	2015
Toilets					
Single Family	12.8	25.2	37.2	48.7	64.4
Multi Family	1.8	3.5	5.1	6.7	8.9
Non Residential	5.9	11.5	17.0	22.3	29.4
Subtotal Toilets	*20.5*	*40.2*	*59.3*	*77.7*	*102.6*
Showerheads					
Single Family	3.6	6.8	9.8	12.4	14.8
Multi Family	0.5	0.9	1.3	1.7	2.0
Subtotal Showerheads	*4.1*	*7.8*	*11.1*	*14.1*	*16.8*
Total Savings	**24.6**	**48.0**	**70.4**	**91.8**	**119.5**

[23] In the case of multi-family and commercial property, the permit approval requirements apply only if (a) the improvements would increase building floor area by more than 10%, or (b) the value of the improvements exceed $150,000, or (c) the improvements are in a room containing non-compliance plumbing fixtures.

5.3 Expected Savings from Rates

Water savings from expected rate adjustments in Stockton District were also calculated. The estimates are based on inflation-adjusted changes in rates for 2011, 2012, and 2013, as contained in CPUC's proposed GRC decision. Short-run price elasticity estimates used to calculate potential changes in demand were drawn from the CUWCC's conservation rate guidebook.[24] Expected water savings from the proposed rate increase are shown in Table 5-2.[25] The decreases in the real cost of water in 2012 and 2013 more than offset the increased cost in 2011 so that by 2015 demand is projected to increase by approximately 150 AF in response to lower water costs.

Table 5-2. Stockton District 2011-2015 Water Savings from Proposed Rate Adjustment

Rate-Driven Water Savings (AF)	2011	2012	2013	2014	2015
% Change in Inflation-Adjusted Water Rate[1]	5%	-3%	-3%	NA	NA
Expected Savings	**68.2**	**101.0**	**92.4**	**15.7**	**-149.7**

[1]Percent change does not include adjustments to the future costs of purchased water, assessments charged for pumping groundwater, electricity, and other costs generally beyond Cal Water's control. Additionally, some water system improvements approved by the CPUC will not be included in rates until they are completed and are in service.

5.4 Expected Savings from Current Programs

In addition to savings from codes and rates, expected on-going water savings from district conservation program activity occurring in 2009 and 2010 was also taken into account. These savings are expected to be about 35 AF in 2015, as shown in Table 5-3.[26]

[24] California Urban Water Conservation Council, "Designing, Evaluating, and Implementing Conservation Rate Structures," July 1997, p. 8-18. Price elasticity measures the expected percentage change in demand given a one percent change in price. For example, an elasticity of -0.25 indicates that a one percent increase in price would be expected to result in a 0.25 percent decrease in demand.

[25] The savings estimates in the table were derived using the methodology and assumptions contained in *Rebuttal to DRA's Report on the Conservation Expenditures of California Water Service Company (California Water Service Company Application 09-07-001), prepared by David Mitchell and Gary Fiske, March 29, 2010.*

[26] Estimated savings from 2009 and 2010 program activity are taken from the report *Achieving Conservation Targets: Conservation Program Recommendations and Budgets for California Water Service Company Districts: Test Years 2011 through 2013, prepared by M.Cubed, Gary Fiske and Associates, and A&N Technical Services, June 2009.*

Table 5-3. Stockton District Water Savings from 2009-10 Conservation Programs

Existing Programs (AF)	2011	2012	2013	2014	2015
Existing Programs: 2009-10	60.7	59.7	58.8	46.8	34.8
Total Existing Programs	**60.7**	**59.7**	**58.8**	**46.8**	**34.8**

5.5 Adjusted Baseline Demand

The adjusted baseline demand is calculated by deducting expected savings from codes, rates, and past programs from the unadjusted demand projection presented in Section 2. The adjusted baseline demand is shown in Table 5-4.

Table 5-4. Stockton District Adjusted Baseline Demand Projection

Adjusted Baseline (AF)	2011	2012	2013	2014	2015
Unadjusted Baseline	31,741	31,815	31,889	31,963	32,036
Less Savings from					
Codes	61	120	175	228	295
Schedule Rate Increases	68	101	92	16	-150
Existing Programs	61	60	59	47	35
Adjusted Baseline Demand (AF)	**31,551**	**31,534**	**31,562**	**31,672**	**31,856**
Per Capita (GPCD)	172	172	172	172	173

5.6 Water Savings Needed from New Programs

The amount of water savings required from new conservation programs is not the same for SBx7-7 and MOU Flex Track compliance. In the case of SBx7-7, the objective is to reduce 2015 per capita water use at least to the target in Table 4-1, and any expected savings from codes, rates, and existing conservation programs can be credited toward meeting this goal. This is not the case for MOU Flex Track compliance, where the objective is to implement conservation programs that would save at least as much as the Flex Track target. Unlike SBx7-7, water savings from codes and rates cannot be credited against the Flex Track target. Only savings from existing conservation programs can be deducted.

Savings required from new conservation programs to meet SBx7-7 and MOU Flex Track compliance requirements are summarized in Table 5-5. In the case of SBx7-7, expected savings from codes, rates, and existing programs results in an adjusted

baseline demand that is 251 AF less than the SBx7-7 target demand. However, an additional 5% reduction in adjusted baseline demand will be required to meet the 2020 SBx7-7 target. In the case of MOU Flex Track compliance, additional water savings of 91 AF are needed by 2015.

Table 5-5. Stockton District New Program Savings Required for SBx7-7 and MOU Compliance

2015 Net Savings Requirement (AF)	**SBx7-7**	**MOU Flex Track**
Gross Savings Requirement (Tbl 4-4)	**-71**	**126**
Less		
Savings from codes (Tbl 5-1)	295	NA
Savings from rates (Tbl 5-2)	-150	NA
Savings from existing programs (Tbl 5-3)	35	35
Subtotal Expected Savings	*180*	*35*
Savings Required from New Programs[1]	**-251**	**91**

[1]*Negative net savings indicates that no new program savings required for compliance*

Table 5-6 compares the adjusted baseline demand in gpcd to the 2015 SBx7-7 and MOU Flex Track targets. Adjusted baseline demand is about 1 gpcd less than the district's 2015 SBx7-7 target, about 1 gpcd greater than its 2015 Flex Track target, and about 8 gpcd greater than its 2020 SBx7-7 target.

Table 5-6. Stockton District 2015 GPCD Required for SBx7-7 and MOU Compliance

Demand Projection	**Demand (GPCD)**	**Difference from Adjusted Baseline (GPCD)**
Adjusted Baseline	173	
SBx7-7 Target	174	1
MOU Flex Track Target	172	-1

The next two sections of the plan describe the analyses undertaken to identify the best mix of new conservation programs to help South San Francisco District achieve the required savings for MOU Flex Track and SBx7-7 compliance.

6 Conservation Program Analysis

6.1 Introduction

Cal Water engaged in a detailed, multi-step process to identify the best mix of programs to achieve the required savings. The process began with an inclusive universe of potential program concepts. These concepts were qualitatively analyzed to eliminate those that were clearly inappropriate for each district and thereby narrow the analytical focus to those remaining programs that were potentially appropriate. Those programs were then subjected to detailed quantitative analysis. This Section describes the steps of the analytical process for Stockton District, and the programs that emerged as potential components of a portfolio of programs for the district. Section 7 will then describe the process of creating this portfolio.

6.2 Conservation Program Concepts

As a result of an exhaustive search of the literature, consultation with experts in the field, knowledge of conservation programming by other water suppliers, and the experience of the project team, a universe of more than 75 conservation program concepts was defined. At this point in the process, the goal was to be as inclusive as possible. The list was therefore intentionally large to ensure that all possible program concepts were considered. Cal Water did not want to risk inadvertently excluding a program from consideration.

For the purposes of this plan, a conservation program concept is comprised of two components:

- Targeted technologies or changes in customer behavior; and
- A delivery mechanism by which customers will be encouraged (or required) to adopt the technology(ies) or change their behavior. Key delivery mechanisms that apply to one or more measures/technologies include:
    - **Customer rebates or vouchers**. Customers who choose to participate in the program receive either cash rebates upon suitable evidence of purchase and/or installation or vouchers that can be used to purchase the water efficient device or fixture.
    - **Vendor, distributor and contractor incentives**. Instead of providing incentives to customers, they are provided to 'upstream' entities such as vendors, distributors, or contractors to encourage them to promote water-efficiency devices or fixtures.
    - **Retrofit/conversion on resale ordinance**. Prior to sale of a property, the seller must retrofit or convert to the designated water-efficient technology.

- **Direct distribution**. Devices or fixtures are directly provided to eligible customers at designated sites, either by the utility or by vendors or distributors.
- **Direct install**. Devices or fixtures are delivered and installed at the customer premises.
- **New construction ordinance**. All specified categories of new construction are required to include the designated technology(ies).
- **Audits/Surveys**. These are customer-specific assessments, focused on a particular technology, to determine whether and how that technology is applicable to the customer and the volume of water that might be saved. These audits are to be distinguished from the more general audits and surveys, which are designed to identify a variety of water savings opportunities.
- **Customized incentives**. Unlike the rebate and voucher incentives described above, these incentives are tailored to each customer based on the results of an audit.
- **Mandatory operating standards**. Designated types of equipment are required to be operated in particular ways to reduce water usage.
- **Demonstration**. For new technologies, demonstration projects can be implemented to gather information about their more general applicability.
- **Utility system maintenance**. Water savings from these measures come from enhancements to the utility's own delivery system. Unlike the other mechanisms, this one is not associated with individual customers and occurs on the utility's side of the meter.

Each program may apply to multiple customer classes (Single Family, Multi-Family, Commercial/ Industrial/Institutional, and Large Landscape).

The universe of program concepts, shown in Table 6-1, Table 6-2, and Table 6-3, includes programs targeting indoor, outdoor, and general end-uses. It includes programs that have been successfully implemented by many other utilities as well as programs that do not have such a history. It includes some programs for which there is a considerable amount of available savings and cost data, and others for which little or no such data exists.

Table 6-1. Stockton District Indoor Conservation Program Concepts

Technology/Intervention	Delivery Mechanism	Single Family	Multi-Family	CII
HE Toilets	Customer rebates or vouchers	x	x	x
	Vendor, distributor & contractor incentives	x	x	x
	Retrofit on resale ordinance	x	x	x
	Direct distribution (by utility, community group, vendor)	x	x	x
	Direct install	x	x	x
Urinals	Customer rebates or vouchers			x
	Vendor, distributor & contractor incentives			x
	Retrofit on resale ordinance			x
	Direct distribution (by utility or vendor)			x
	Valve replacement			x
Clotheswashers: in-unit, common area, & coin-op	Customer rebates & vouchers	x	x	x
	Vendor, distributor & contractor incentives	x	x	x
	New construction ordinance		x	x
Industrial laundries	Audits			x
	Customized incentives			x
Showerhead (2.0, 1.5 gpm)/ flapper/aerators	Kit distribution or install	x	x	x
Showerhead (1.5 gpm)	Customer rebates or vouchers	x	x	x
Shower timers, Reminder cards	Direct distribution	x	x	x
Faucets (reduced flow, auto shut-off)	Customer rebates or vouchers	x	x	x
Hot Water recirculation, point-of-use, or demand Systems	Customer rebates or vouchers	x	x	x
	Retrofit on resale ordinance	x	x	x
	New construction ordinance	x	x	x
Hot water pipe insulation	Retrofit on resale ordinance	x	x	x
	New construction ordinance	x	x	x
Cooling Towers	Customer rebates, customized incentives			x
Food Steamers	Customer rebates			x
Ice Machines	Customer rebates			x
Steam Sterilizers	Customer rebates			x
Vacuum Pumps	Customer rebates			x
Car Washes	Mandatory operating standards			x
	Customer rebates			x
	Audits			x
Dishwashers	Customer rebates or vouchers	x	x	x
	New construction ordinance		x	x
	Vendor, distributor & contractor incentives	x	x	x
Spray valves	Direct install			x
	Customer rebates			x

Technology/Intervention	Delivery Mechanism	Single Family	Multi-Family	CII
	Audits			x
Sensor-operated faucets	Customer rebates or vouchers			x
Plan requirement (indoor & outdoor)	New construction ordinance	x	x	x
Self-generating water softener replacement	Customer rebates	x	x	x
	Operating restrictions	x	x	x
X Ray film & photo processors	Customer rebates			x
Industrial process	Audits & incentives			x
Wet cleaning systems	Customer rebates			x
Evaporative Coolers	Customer rebates	x	x	X
An "x" indicates the program could be offered to the indicated customer class.				

Table 6-2. Stockton District Outdoor Conservation Program Concepts

		CUSTOMER CLASS			
Technology/Intervention	Delivery Mechanism	Single Family	Multi-Family	CII	Lg Lndscp
Large Landscape Surveys					x
WBIC	Direct Install	x	x	x	x
	Customer rebate	x	x	x	x
	Vendor, distributor & contractor incentives	x	x	x	x
	Direct distribution	x	x	x	x
Irrigation System (including, but not limited to, high efficiency nozzles for pop-up heads, drip, soil moisture sensors, rain shut off, pressure control)	New construction ordinance	x	x	x	x
	Customer rebate	x	x	x	x
	Vendor, distributor & contractor incentives	x	x	x	x
	Retrofit on resale ordinance	x	x	x	x
Landscape design	Customer rebate	x	x	x	x
	Vendor, distributor & contractor incentives	x	x	x	x
	Conversion on resale ordinance	x	x	x	x
	New construction ordinance	x	x	x	x
Turf buy back (Cash for Grass)	Customer rebate	x	x	x	x
Artificial Turf	Customer rebate	x	x	x	x
Water Budgets	(Potentially rate-linked)	x	x	x	x
Large Landscape Water Use Reports					x
Pool, hot tub covers & other upgrades	Customer rebate or voucher	x	x	x	
Water Brooms	Customer rebate or voucher			x	
	Direct distribution			x	
Dedicated Irrigation Meters	Customer rebate	x	x	x	
	New construction ordinance	x	x	x	
An "x" indicates the program could be offered to the indicated customer class.					

Table 6-3. Stockton District General Conservation Program Concepts

		CUSTOMER CLASS			
Technology/Intervention	**Delivery Mechanism**	**Single Family**	**Multi-Family**	**CII**	**Lg Lndscp**
Audits & Surveys (incl high bill contacts)*		x	x	x	x
Meter installation	Direct Install	x	x	x	x
Water use meter alerting device		x	x	x	x
"Smart Meters"	Demonstration	x	x	x	x
Increased billing frequency		x	x	x	x
Water waste ordinance		x	x	x	x
Water recycling, grey water use, rainwater harvesting	Customized incentives	x	x	x	x
New construction guidelines		x	x	x	x
New const conservation offsets		x	x	x	x
System loss prevention, leak detection & repair	Utility system maintenance				
An "x" indicates the program could be offered to the indicated customer class.					

6.2.1 Concept Screening

Once the universe of program concepts was defined, the next step was to subject each program concept to a careful district-specific qualitative screen, the objective of which was to eliminate those program concepts that were clearly inappropriate. For this purpose, six screening criteria were developed:

1. **Implementation feasibility**. Are the administrative, staffing, billing, institutional, legal, and/or political difficulties associated with implementing the program acceptable?
2. **Customer/stakeholder acceptability**. Will the program likely be deemed acceptable by customers and/or other key program stakeholders?
3. **District match**. Is the technology well matched to the customers, appliance stocks, climate, building stock, and/or other characteristics of the service area? Are there enough target sites in the district to warrant developing and operating the program?
4. **Relationship to other programs**. Does the program reinforce rather than duplicate or conflict with other existing or proposed conservation programs?
5. **Program costs**. Are the expected costs of the program acceptable?
6. **Certainty of savings**. Are we able to forecast future program savings with a sufficient degree of certainty? Is our savings forecast sufficiently reliable?

For each program concept, Cal Water staff answered "yes" or "no" for each of these criteria. A "yes" answer on each of these criteria was considered to be essential for program success. Thus, a negative response to any one of the criteria for a particular program concept eliminated that concept from further consideration.

The programs passing the qualitative screen for Stockton District are shown in Table 6-4.

Table 6-4. Stockton District Program Concepts Passing Qualitative Screen

		CUSTOMER CLASS			
Technology/Intervention	**Delivery Mechanism**	**Single Family**	**Multi-Family**	**CII**	**Lg Lndscp**
INDOOR					
HE Toilets	Customer rebates or vouchers	x	x	x	
	Vendor, distributor & contractor incentives	x	x	x	
	Distribution (by utility, community group, vendor)	x	x	x	
	Direct install	x	x	x	
Urinals	Customer rebates or vouchers			x	
	Vendor, distributor & contractor incentives			x	
	Distribution (by utility or vendor)			x	
	Valve replacement			x	
Clotheswashers: in-unit, common area, & coin-op	Customer rebates & vouchers	x	x	x	
	Vendor, distributor & contractor incentives	x	x	x	
Industrial laundries	Audits			x	
	Customized incentives			x	
Showerhead (2.0, 1.5 gpm)/ flapper/aerators	Kit distribution or install	x	x		
Shower timers, Reminder cards	Distribution	x	x		
Cooling Towers	Customer rebates, customized incentives			x	
Food Steamers	Customer rebates			x	
Ice Machines	Customer rebates			x	
Steam Sterilizers	Customer rebates			x	
Vacuum Pumps	Customer rebates			x	
Car Washes	Customer rebates			x	
	Audits			x	
Spray valves	Customer rebates			x	
	Audits			x	
X Ray film & photo processors	Customer rebates			x	
Industrial process	Audits & incentives			x	
OUTDOOR					
Large Landscape Surveys					x
WBIC	Direct Install	x	x	x	x

		CUSTOMER CLASS			
Technology/Intervention	**Delivery Mechanism**	**Single Family**	**Multi-Family**	**CII**	**Lg Lndscp**
	Customer rebate	x	x	x	x
	Vendor, distributor & contractor incentives	x	x	x	x
	Distribution	x	x	x	x
Irrigation System (including, but not limited to, high efficiency nozzles for pop-up heads, drip, soil moisture sensors, rain shut off, pressure control)	Customer rebate	x	x	x	x
	Vendor, distributor & contractor incentives	x	x	x	x
Landscape design	Customer rebate	x	x	x	x
	Vendor, distributor & contractor incentives	x	x	x	x
Turf buy back (Cash for Grass)	Customer rebate	x	x	x	x
Large Landscape Water Use Reports					x
Pool, hot tub covers & other upgrades	Customer rebate or voucher	x	x	x	
GENERAL					
Audits & Surveys (incl high bill contacts)		x	x	x	x
Water use meter alerting device		x	x	x	
Water recycling, grey water use, rainwater harvesting	Customized incentives	x	x	x	
Education/outreach		x	x	x	x

6.2.2 Preliminary Quantitative Analysis

A preliminary quantitative analysis was conducted on the programs that passed the qualitative screen. To do that, estimates were made of key savings and cost parameters for each of the programs in Table 6-4. Where applicable, these estimates were based on prior Cal Water experience with similar programs. In the absence of such experience, the experience of other water suppliers, the expertise of the project team, consultation with national experts, and published figures, where available, were relied upon. In particular, estimates developed by the California Urban Water Conservation Council and the Alliance for Water Efficiency were utilized where such estimates were available. While in most cases, the savings assumptions for a program do not vary across districts, for several programs, they do due to district-specific characteristics of household size, climate, etc. Other than meter installation, program cost assumptions are uniform across districts, although in some cases, cost sharing with other water utilities reduce Cal Water's share.

The specific savings and cost variables that were estimated for each program are as follows.

Savings Parameters

Unit savings. The savings in gallons per year that can be expected per device or intervention.

Savings decay. The annual rate at which the unit savings will decay due to behavioral attrition or physical device limitations.

Seasonal distribution. The percentage of the annual savings that will occur during the peak season. Generally, this parameter will differ between indoor and outdoor programs.

Useful life. The expected life of the device or intervention over which the savings will persist.

Free riders. The percentage of program participants who would be expected to have acted in the absence of the program and for whom, therefore, there is assumed to be no incremental savings.

Natural replacement. The annual rate at which customers would be expected to replace their inefficient fixtures in the absence of utility intervention, due either to code requirements or market forces.

Cost Parameters

Initial variable cost. The cost the utility must pay per device or intervention at the time that the device is installed or the intervention occurs. This cost could include such things as the cost of a fixture, a survey, a customer rebate, a voucher, plus the cost for program administration and marketing.

Follow-up variable cost. Subsequent annual per-device or intervention costs the utility must pay to maintain the program savings.

Follow-up years. The number of years the follow up costs will persist.

6.2.3 Identification of Core and Non-Core Programs

A key challenge facing Cal Water is finding a way to efficiently scale up conservation programming across its 24 districts with the limited staffing it has to implement and manage these programs. The current GRC decision authorizes 4 full-time conservation program staff for 2011-13. These staff will be responsible for implementing and managing programs in 24 geographically dispersed districts serving a combined population of over 1.7 million.[27] As will be discussed in Section 7, Cal Water intends to propose to the CPUC adding three more conservation positions beginning in 2014 so that it can divide its districts into four program management regions. Even with the added staffing, the most efficient way for Cal Water to manage programs across its geographically dispersed districts is to

[27] By way of comparison, the East Bay Municipal Utility District has a conservation program staff of 21 full-time positions serving a population of 1.3 million within a geographically contiguous and compact service area.

standardize programs and centralize their implementation and oversight. Using the results of the qualitative screening and preliminary quantitative analysis, Cal Water identified five core programs that it would run in every district over the next five years. The following criteria were used for selecting core programs:

- Scalable – programs were more likely to be selected if they could simultaneously be run at low volumes in smaller districts and at much higher volumes in larger districts.
- Vendor Operation – programs were more likely to be selected if they could be operated by third-parties specializing in water conservation program implementation.
- Scale Economies – programs were more likely to be selected if aggregation of material purchases could lower unit costs of implementation.
- Synergy with Regional Programs – programs were more likely to be selected if they complemented or could leverage regional conservation programs that may be available to the district.
- Program Diversity –programs were selected to ensure a mix of programs for residential, commercial, industrial, and landscape customer segments.
- Proven Track Record – programs were more likely to be selected if they had demonstrated water savings and a proven track record of implementation by other water providers.
- Low Unit Cost – programs were more likely to be selected if they had low unit costs of implementation relative to other program options.[28]

In addition to the core programs, an additional set of non-core programs was selected. Unlike core programs, Cal Water may not offer non-core programs in every district or in every year. Implementation of non-core programs will depend on whether additional water savings are required for SBx7-7 compliance, MOU compliance, or to help address local supply constraints.

The set of core and non-core programs that Cal Water will offer over the next five years is shown in Table 6-5.

[28] A program's unit cost was only one factor taken into account, which had to be balanced against other competing criteria, such as scalability, program diversity, and synergy with regional programs.

Table 6-5. Cal Water Conservation Programs

Program Name	Description	Target Market
CORE PROGRAMS		
Rebate/Vouchers for toilets, urinals, and clothes washers	Provide customer rebates for high-efficiency toilets, urinals, and clothes washers	All customer segments
Residential Surveys	Provide residential surveys to low-income customers, high-bill customers, and upon customer request or as pre-screen for participation in direct install programs	All residential market segments
Residential Showerhead/Water Conservation Kit Distribution	Provide residential showerhead/water conservation kits to customers upon request, as part of residential surveys, and as part of school education curriculum	All residential market segments
Pop-Up Nozzle Irrigation System Distribution	Offer high-efficiency pop-up irrigation nozzles through customer vouchers or direct install.	All customer segments
Public Information/Education	Provide conservation messaging via radio, bill inserts, direct mail, and other appropriate methods. Provide schools with age appropriate educational materials and activities. Continue sponsorship of Disney Planet Challenge program.	All customer segments
NON-CORE PROGRAMS		
Toilet/Urinal Direct Install Program	Offer direct installation programs for replacement of non-HE toilets and urinals	All customer segments
Smart Irrigation Controller Contractor Incentives	Offer contractor incentives for installation of smart irrigation controllers	All customer segments
Large Landscape Water Use Reports	Expand existing Cal Water Large Landscape Water Use Report Program providing large landscape customers with monthly water use reports and budgets	Non residential customers with significant landscape water use and potential savings
Large Landscape Surveys & Irrigation System Incentives	Provide surveys and irrigation system upgrade financial incentives to large landscape customers participating in the Large Landscape Water Use Reports programs and other targeted customers	Non residential customers with significant landscape water use and potential savings
Food Industry Rebates/Vouchers	Offer customer/dealer/distributor rebates/vouchers for high-efficiency dishwashers, food steamers, ice machines, and pre-rinse spray valves	Food and drink establishments, institutional food service providers
Cooling Tower Retrofits	Offer customer/dealer/distributor rebates/vouchers of cooling tower retrofits	Non-residential market segments with significant HVAC water use
Industrial Process Audits and Retrofit Incentives	Offer engineering audits/surveys and financial incentives for process water efficiency improvement	Non-residential market segments with significant industrial process water uses

6.3 Benefit-Cost Analysis of Core and Non Core Programs

Core and non-core programs were then subjected to a detailed benefit cost analysis, the results of which were used to inform program portfolio development discussed in the next section. The first step in this process was to refine and finalize the savings and cost specifications of each program. The final assumptions for the Stockton District programs are provided in Appendix 2.

The program savings and cost assumptions enable the calculation of program benefits and costs to the utility and its ratepayers, and comparisons of these costs in the form of benefit-cost ratios. The tool used to do this comparison was a simplified version of the Alliance for Water Efficiency Tracking Tool. Following are descriptions of how the model calculates and compares conservation program benefits and costs.

Program Benefits

For each acre-foot of water saved by a conservation program in a particular year – and in a particular season – the benefit to the utility is given by that year's/season's avoided cost, as described in Section 2.7. The model calculates the programmatic savings (that is, the savings that can be attributed to the utility program) for each year/season based on the program water savings parameters shown in Appendix 2. Each year's/season's programmatic savings is then multiplied by that year's real-dollar avoided costs to compute the annual program benefits. The model then computes the present value of these benefits.[29]

Program Costs

For each device/intervention, the model uses the program cost parameters shown in Appendix 2 to compute the annual costs the utility will incur. It then computes the present value of these costs.

Benefit-Cost Ratios

For each program, the benefit-cost ratio (BCR) is the quotient of the present value of the program benefits and the present value of the program costs. A BCR greater than 1 indicates that, over time, the program provides a positive net benefit to the utility and its ratepayers. Table 6-6 shows the BCRs for the Stockton District programs. As described in Section 7, these BCRs were a key input to the development of the recommended district conservation portfolio.

[29] Present values are computed using a 3.4% real discount rate, which is based on a 6% nominal discount rate and a 2.5% annual inflation rate.

Table 6-6. Stockton District Core and Non-Core Program Benefit-Cost Ratios

Program ID	Program Name	Customer Class	BCR
1	HE Toilets: Cust Rebates or Vouchers	Single Family	0.94
2	HE Toilets: Cust Rebates or Vouchers	Multi Family	2.01
3	HE Toilets: Cust Rebates or Vouchers	Commercial	0.56
4	Clotheswasher: Cust Reb or Voucher	Single Family	0.33
5	CW common: Cust Reb or Voucher	Multi Family	0.38
6	CW in-unit: Cust Reb or Voucher	Multi Family	0.24
7	CW coin-op: Cust Reb or Voucher	Commercial	0.48
8	Urinals (0.25 gpf): Cust Rebates or Vouchers	Commercial	0.37
9	HE Toilets: Direct Install	Single Family	0.41
10	HE Toilets: Direct Install	Multi Family	1.19
11	HE Toilets: Direct Install	Commercial	0.33
12	Urinals: Direct Install	Commercial	0.40
13	Audits & Surveys (incl high bill contacts)	Single Family	0.26
14	Audits & Surveys (incl high bill contacts)	Multi Family	0.30
15	Audits & Surveys (incl high bill contacts)	Commercial	0.31
16	High Efficiency Pop-Up Nozzle Web Voucher	Single Family	2.53
17	High Efficiency Pop-Up Nozzle Web Voucher	Multi Family	2.53
18	High Efficiency Pop-Up Nozzle Web Voucher	Commercial	2.53
19	Showerhead/Aerator,Tablet Kit Dist	Single Family	0.47
20	Showerhead/Aerator,Tablet Kit Dist	Multi Family	0.47
21	WBIC Vendor, Dist, & Cont Inc	Single Family	0.28
22	WBIC Vendor, Dist, & Cont Inc	Multi Family	0.63
23	WBIC Vendor, Dist, & Cont Inc	Commercial	0.63
24	Large Landscape Water Use Reports	Irrigation	0.27
25	Lg Lndscp Surveys & Irrig Sys: Rebates	Irrigation	0.53
26	Comm Irrigation System: Rebates	Commercial	2.14
27	Dishwashers: Vendor, Dist & Cont Inc	Commercial	3.63
28	Food Steamers: Cust Rebates	Commercial	0.41
29	Ice Machines: Cust Rebates	Commercial	1.65
30	Pre-Rinse Spray Valves: Cust rebates	Commercial	1.53
31	Cooling Tower Cond Cont: Cust Reb, Inc	Industrial	0.79
32	Cooling Tower pH Cont: Cust Reb, Inc	Industrial	0.80
33	Industrial Process: Audits & Incentives	Industrial	0.59

7 Portfolio Development

7.1 Introduction

This section of the plan presents the recommended conservation program portfolio for Stockton District. The program analysis results described in Section 6 provided the starting point for portfolio development. The next step was to determine the annual levels of program activity needed to, at minimum, meet Stockton District's water savings targets. Several considerations informed these decisions, including budgetary constraints included in the current GRC decision, Cal Water conservation program administrative capacity, program market and water savings potential, and the program benefit-cost results presented in Section 6.

7.2 SBx7-7 and MOU Savings Targets

Section 5 showed that water savings from existing water efficiency codes and ordinances, scheduled adjustments to water rates, and past investment in conservation programs are expected to be sufficient to meet Stockton District's 2015 SBx7-7 per capita water use target. It also showed that an additional 9 AF of water savings from new programs would be required to satisfy MOU compliance requirements in 2015. This established the minimum level of water savings the program portfolio would need to produce by 2015.

7.3 2011-13 General Rate Case Decision

Cal Water's current GRC decision established conservation budgets for each district for the years 2011-2013. These budgets specify the total annual expenditure on conservation programs allowed under the GRC decision, as well as the maximum amount that can be allocated to (1) program administration and research, (2) public information and school education programs, (3) residential conservation programs, and (4) non-residential conservation programs. Table 7-1 shows these budgetary restrictions for Stockton District.

Table 7-1. Stockton District GRC Conservation Program Expenditure Constraints

Budget Constraint ($000)	2011	2012	2013
Overall Budget	$700.0	$700.0	$700.0
Admin & Research	$86.7	$86.9	$86.9
Public Info & School Educ.	$140.0	$140.0	$140.0
Programmatic Activity	$473.3	$473.1	$473.1
Expenditure Caps			
Residential Programs	$505.5	$505.5	$505.5
Non Residential Programs	$524.0	$524.0	$524.0

7.4 Minimum and Maximum Program Levels

For each district, Cal Water specified minimum and maximum program activity levels to guide portfolio development. The minimum levels were those below which it would not be administratively feasible or cost-effective to offer the program in the district, while the maximum levels were those that could reasonably be achieved given district customer characteristics, current market demand, and past experience marketing similar programs/technologies to district customers. As part of development of this plan, Cal Water matched its non-residential customer accounts to North American Industrial Classification (NAICS) 4-digit codes, which enabled it to estimate the number of businesses in the Bear Gulch District that would potentially participate in the non-residential programs. It also identified, using a review and analysis of prior consumption, the number of large landscape customers in the district so that it could accurately assess potential participation levels and savings potential for large landscape conservation programs. The constraints placed on annual program activity levels are presented in Appendix 2.

7.5 Recommended Annual Program Activity and Staff Levels

7.5.1 Residential and Non-Residential Conservation Programs

Recommended annual program levels for residential and non-residential programs are shown in Table 7-2. The program levels were derived from the following decision rules:[30]

- For 2011-13, set annual program activity to maximize water savings subject to the GRC conservation program budget constraints and the min/max annual activity constraints. This ensured that the portfolio would reflect the least-cost mix of core and non-core conservation programs consistent with the GRC budget constraints.

- For 2014-15, set annual activity of programs with BCRs greater than one to their maximum level. This ensured that the portfolio would benefit ratepayers by helping to lower average water supply costs.

- For 2014-15, if needed to satisfy the 2015 SBx7-7 and MOU Flex Track water savings targets, increase program activity of programs with BCRs less than one in order of cost-effectiveness. This ensured the least-cost set of activity levels needed to achieve the water savings targets.

For Stockton District, the decision rules cause programs with BCRs less than one to be set to their minimum implementation levels in 2014 and 15, while programs with BCRs equal to or greater than one to be set to their maximum levels. Hence the large increase in pop-up nozzle distribution and the reduction in customer surveys/audits starting in 2014.

[30] Linear programming models were used to implement the decision rules.

Table 7-2. Stockton District Recommended Residential and Non-Residential Program Levels

Program	Recommended Annual Activity Levels[1]				
	2011	2012	2013	2014	2015
CORE PROGRAMS					
Rebates/Vouchers					
Toilets	740	740	740	420	420
Clothes Washers	200	200	190	170	170
Urinals	0	0	0	0	0
Customer Surveys/Audits	120	120	120	110	110
Conservation Kit Distribution	1,190	1,190	1,190	350	350
Pop-Up Nozzle Distribution	22,200	22,200	22,200	22,200	22,200
NON-CORE PROGRAMS					
Direct Install Toilets/Urinals	430	430	430	510	510
Smart Irr. Controller Vendor Incentives	10	10	10	10	10
Large Landscape Water Use Reports	60	60	60	150	150
Large Landscape Surveys/Incentives	100	100	100	90	90
Commercial Kitchen Rebates/Vouchers	0	0	0	30	30
Cooling Tower/Process Water Retrofit Incentives	10	0	0	0	0

[1]Annual activity levels are aggregated across customer classes and rounded up to the nearest 10 units of activity. Appendix 2 contains the detail modeling results broken down by customer class and program measure.

7.5.2 Administration & Research

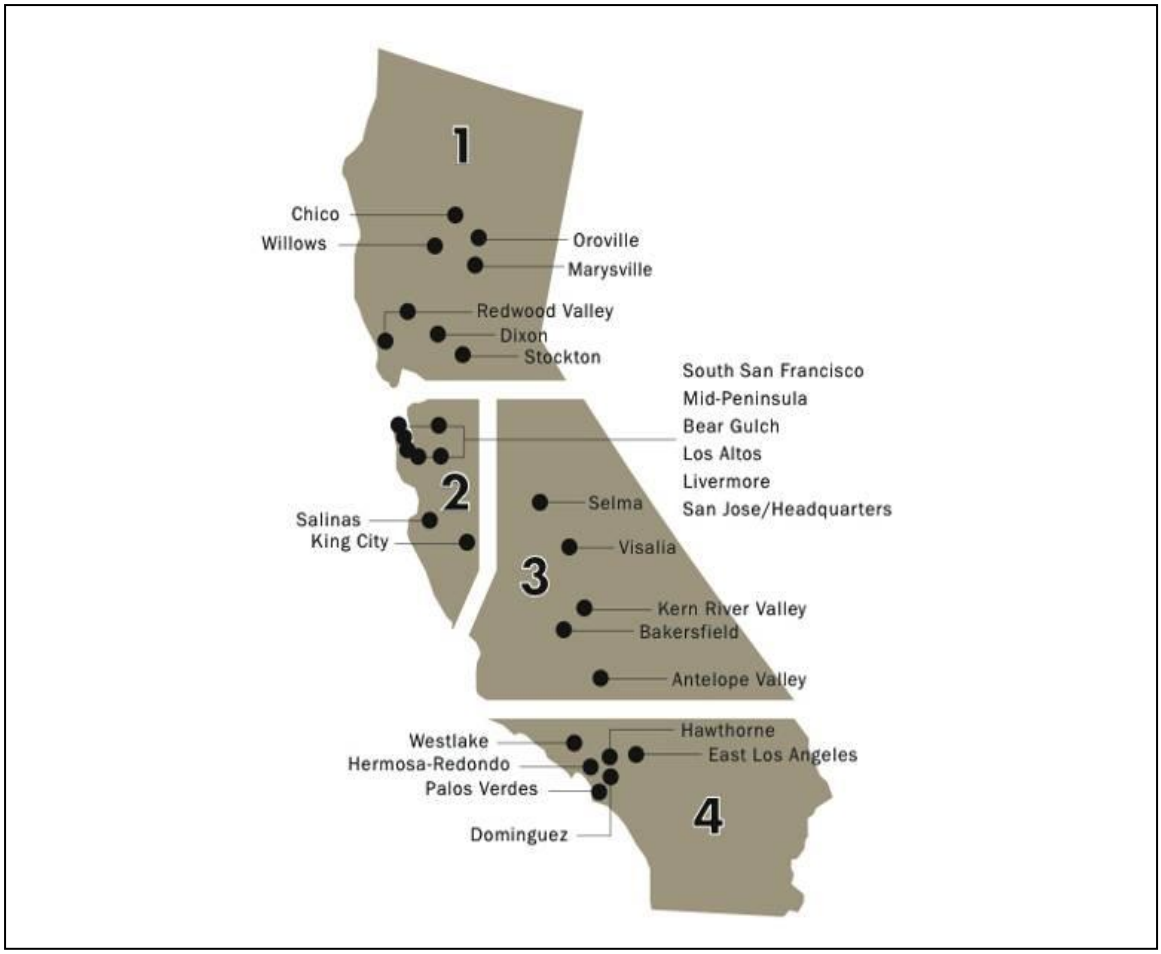
District staff levels and expenditure for administration and research for 2011-13 are set by the current GRC. At present, Cal Water divides its 24 districts into two program management regions which are administered by its two conservation program coordinators. Program reporting and analysis will be conducted by its conservation program analyst. Proposed expenditures for 2014 and 2015 assume two additional conservation program coordinator positions and one additional conservation analyst position for a total of seven full-time positions. Given the scale and diversity of programs proposed in this plan and the geographic dispersion of Cal Water's districts, this is the minimum staffing level recommended for program implementation, and assumes Cal Water will divide its 24 districts into four program management regions, as shown in Figure 7-1, with one program coordinator assigned to each region. Stockton District would be within program management region 1. Program administration costs for 2014-15 are prorated to the districts based on their share of company-wide conservation program expenditures.[31] Proposed annual expenditures for administration and research for Stockton District are shown in Table 7-3.

[31] Projected expenditure in 2014 and 2015 and the allocation of these expenditures to each Cal Water district are shown in Appendix 2.

7.5.3 Public Information & School Education

District expenditure for public information and school education programs in 2011-13 is set by the current GRC. Recommended expenditures in 2014 and 2015 were set to allow some expansion in these programs to support proposed increases in residential and non-residential program levels.[32] Recommended annual expenditures for public information and school education programs are shown in Table 7-3.

Figure 7-1. Cal Water Conservation Program Management Regions



7.6 Projected Annual Program Expenditures

Annual program expenditures based on the recommended program levels and GRC budget allocations are shown in Table 7-3. Appendix 2 provides a detailed

[32] Specifically, the recommended level of expenditure in 2014 and 2015 was set to either 110% of the 2013 public information/school education budget or 10% of recommended expenditures for residential and non-residential programs, whichever was greater. This decision rule ensured continuity with 2011-13 public information/school education program levels while allowing for an expansion of this programming in districts with significant increases in residential and non-residential program activity.

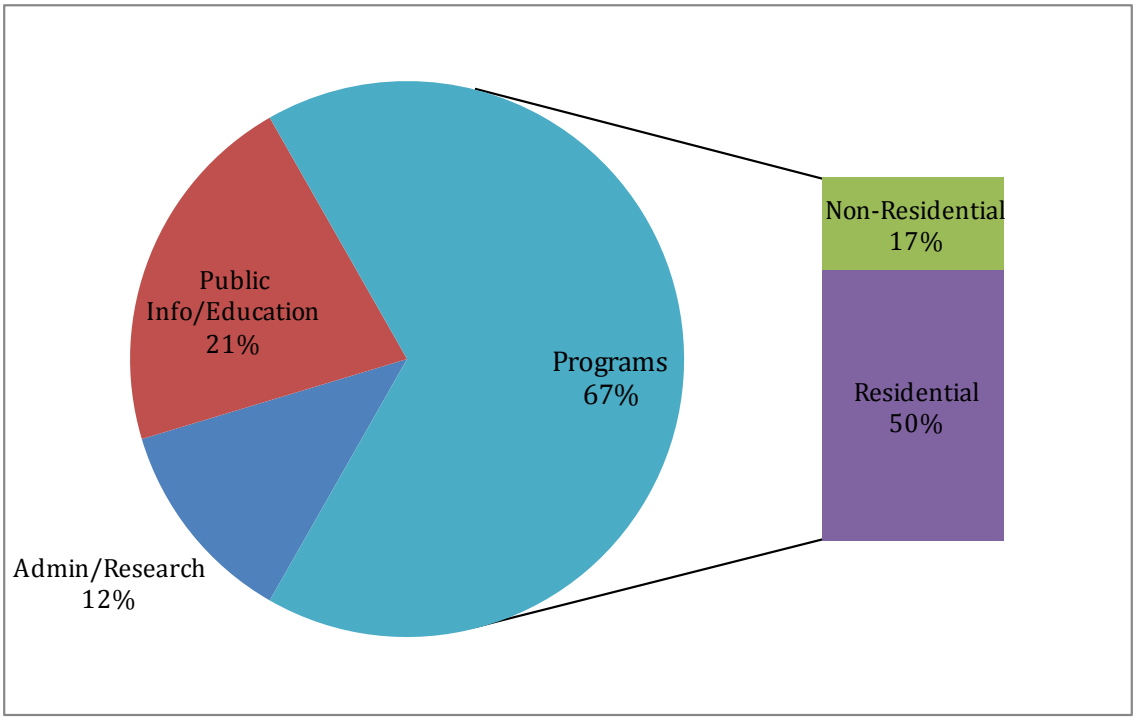
breakdown of these expenditures by year and individual program activity. Figure 7-2 shows the recommended expenditure shares by expenditure category over the entirety of the five-year planning period. The plan allocates approximately 67% of projected expenditure to programmatic activity, 21% to public information and education functions, and 12% to administration and research functions. Within the programmatic expenditure category, approximately three-fourths of planned expenditure is for residential conservation programs and one-fourth is for non-residential programs. The allocation of program expenditures between residential and non-residential program categories reflects both the relative cost-effectiveness of residential versus non-residential programs and the program spending caps contained in the current GRC.

Proposed annual expenditures in 2014 and 2015 are about 93% of the annual expenditure allowed under the current GRC. The decrease results from the decision rule to minimize implementation of programs with BCRs less than one.

Table 7-3. Stockton District Projected Annual Conservation Expenditures

Expenditure Category	Projected Annual Expenditures ($000)				
	2011	**2012**	**2013**	**2014**	**2015**
Program Costs:					
Residential	$361.8	$361.6	$361.6	$298.7	$298.7
Non-Residential	$112.8	$111.5	$111.5	$122.8	$122.8
Program Subtotal	***$474.6***	***$473.1***	***$473.1***	***$421.6***	***$421.6***
Admin/Research	$86.7	$86.9	$86.9	$75.8	$75.6
Public Info/Education	$140.0	$140.0	$140.0	$154.0	$154.0
TOTAL ANNUAL	**$701.3**	**$700.0**	**$700.0**	**$651.3**	**$651.1**

Figure 7-2. Stockton District 2011-15 Conservation Expenditure Shares



7.7 Projected Portfolio Water Savings

Table 7-4 and **Error! Reference source not found.** show projected annual water savings broken down by program category and customer class, respectively. By 2015 projected water savings are approximately 875 AF. Roughly three-fourths of the savings come out of the residential sector and one-fourth come out of the non-residential sector. Projected savings satisfy both the SBx7-7 and MOU Flex Track 2015 targets.

Table 7-4. Stockton District Projected Water Savings by Program

Program	Annual Water Savings (AF)				
	2011	**2012**	**2013**	**2014**	**2015**
CORE PROGRAMS					
Rebates/Vouchers					
Toilets	24.9	48.8	71.7	87.2	102.1
Clothes Washers	5.9	11.5	15.7	17.9	20.0
Urinals	0.0	0.0	0.0	0.0	0.0
Customer Surveys/Audits	5.7	10.8	16.7	20.0	23.0
Conservation Kit Distribution	18.6	34.9	49.3	48.8	48.4
Pop-Up Nozzle Distribution	88.8	177.5	266.3	355.1	443.9
Subtotal Core Programs	***143.8***	***283.4***	***419.7***	***529.1***	***637.4***
NON-CORE PROGRAMS					
Direct Install Toilets/Urinals	22.3	43.6	64.1	88.7	112.3
Smart Irr. Controller Vendor Incentives	0.1	0.2	0.2	0.3	0.4
Large Landscape Water Use Reports	6.5	6.5	6.5	16.3	16.3
Large Landscape Surveys/Incentives	19.2	38.5	57.7	75.0	92.4
Commercial Kitchen Rebates/Vouchers	0.0	0.0	0.0	7.5	15.0
Cooling Tower/Process Water Retrofit Incentives	1.0	1.0	1.0	1.0	1.0
Subtotal Non-Core Programs	***49.1***	***89.8***	***129.6***	***188.9***	***237.4***
Total Core and Non-Core Program Savings	**192.8**	**373.2**	**549.3**	**717.9**	**874.8**

Table 7-5. Stockton District Projected Water Savings by Customer Class

	Annual Water Savings (AF)				
Customer Class	**2011**	**2012**	**2013**	**2014**	**2015**
Single Family	104.6	206.2	305.0	377.8	450.2
Multi Family	45.5	89.4	131.9	179.1	224.8
Commercial/Industrial	33.2	65.2	96.9	134.7	172.3
Irrigation	9.5	12.5	15.5	26.4	27.5
Total Water Savings	**192.8**	**373.2**	**549.3**	**717.9**	**874.8**

7.8 Projected Water Demands

Table 7-6 compares per capita water use under the recommended portfolio to that under the adjusted baseline and the MOU and SBx7-7 targets. Per capita use under the recommended portfolio is 168 gpcd, which is 4 gpcd less than the MOU Flex Track target and 6 gpcd less than the 2015 SBx7-7 target. Per capita demand will need to decrease an additional 3 gpcd between 2015 and 2020 in order to meet the 2020 SBx7-7 per capita target.

Table 7-6. Stockton District Recommended Portfolio Projected 2015 Demand

Demand Projection	Demand (GPCD)	Difference from Adjusted Baseline (GPCD)
Adjusted Baseline	173	
SBx7-7 Target	174	1
MOU Flex Track Target	172	0
Recommended Portfolio	168	-5

7.9 Program Cut Sheets

As part of plan development, one page program summaries, or "cut sheets," were developed for each recommended program. These cut sheets provide a quick reference summarizing program design and marketing, expected level of customer participation, projected water savings, and proposed program expenditure for the period 2011 – 2015. Appendix 1 includes a copy of each program cut sheet for Stockton District.

8 Plan Monitoring and Updates

8.1 Introduction

This conservation master plan is a working document and, as such, will need to be modified and updated as new information becomes available. Cal Water will need to regularly review the plan and make adjustments to it as appropriate. This section of the plan describes key monitoring and updating activities Cal Water anticipates undertaking following plan implementation

8.2 Program Tracking

Cal Water intends to adopt conservation program tracking software that it can use to track and manage its core and non-core programs. Such software will help Cal Water track customer participation in its programs, manage program materials, track program costs, and estimate program water savings. Cal Water will conduct a review of tracking software options in early 2011 with the goal of selecting the deploying the software in spring 2011.

8.3 2014-16 General Rate Case

Implementation of the recommended programs in 2014 and 2015 is contingent upon the outcome of Cal Water's 2014-16 GRC. Cal Water will not know until late 2013 whether the CPUC will approve the 2014-15 conservation program budgets proposed in this plan. Cal Water will submit its initial filing for the 2014-16 GRC in July 2012. Prior to that filing, Cal Water may elect to update this plan to reflect new information and changed circumstances affecting the baseline water demands, calculated water savings targets, recommended conservation programs, projected water savings, and proposed conservation program budgets.

8.4 2015 UWMP

Under SBx7-7 water suppliers may update their baseline demands and per capita water use targets in their 2015 UWMP. As part of its 2015 UWMP preparation, Cal Water may elect to update its baseline demand estimates and gpcd targets, if new information warrants doing so. Depending on the final methodology adopted by DWR for the fourth target calculation method, Cal Water may decide to update the SBx7-7 targets included in the plan using this alternative methodology.

8.5 MOU Flex Track Target

The CUWCC-sanctioned tools for calculating the Flex Track target for MOU compliance were not available during this plans development. Therefore, Cal Water used its own Flex Track calculator to calculate the required volume of water savings. CUWCC tools for calculating the Flex Track target are expected to be available sometime in early 2011. Cal Water may elect to update this plan to reflect a revised Flex Track target based on a CUWCC-sanctioned Flex Track target calculator.

8.6 Water Savings Verification

Cal Water intends to undertake various research projects to verify water savings projections included in these plans. For example, Cal Water and San Jose State University Research Foundation are jointly undertaking a study of realized water savings from converting customers from flat rate to metered billing. This study is expected to commence in early 2011. Results from studies such as this one will be used by Cal Water to update water savings projections.

8.7 Local Codes and Ordinances

Water waste prohibitions and codes and ordinances affecting new construction and landscape design and irrigation enacted by cities and counties in the communities served by Cal Water may alter demands in ways not anticipated by this plan.[33] Cal Water will work with local planning and enforcement departments to ensure that its conservation programs are consistent with and complementary to local water use codes and ordinances, and may elect to modify the design or level of implementation of programs included in the plan in order to do so.

8.8 2015 Plan Update

Cal Water plans to update these plans no less frequently than every five years. These plan updates will correspond to the update and reporting cycle for the UWMPs Cal Water prepares for each district every five years. Plan updates may entail adjustment of existing programs and addition of new programs based on performance history, community input, and changes to state and local conservation requirements.

[33] For example, AB 1881, passed in 2006, gave cities and counties until January 2010 to update an existing or adopt a new landscape water use ordinance to comply with the state's updated model landscape ordinance.

Appendix 1
Conservation Program Cut Sheets

The program cut sheets in this appendix provide a quick reference summarizing program design and marketing, expected level of customer participation, projected water savings, and proposed program expenditure for the period 2011 – 2015.

High Efficiency Toilet Rebate Program

Stockton District

Program Description

High-efficiency toilets use approximately 70% less water than non-efficient toilets and 20% less water than ultra-low flush toilets. This program will provide customer incentives for residential and non-residential high-efficiency toilets. Cal Water will centrally administer the program as part of a company-wide toilet rebate program.

Program Marketing

This program will be available to all residential and non-residential customers. Cal Water will market the program through direct mail, print media, bill stuffers, and its website. Expected program participation levels (rounded up to nearest 10 units) are shown in the table to the right.

Year	Rebate Goal
2011	740
2012	740
2013	740
2014	420
2015	420

*Combined goal for single family, multi family, and commercial toilet rebates.

IMPLEMENTATION COST

Costs Per Rebate and Per AF of Water Savings: Program costs vary by fixture type and customer class. Expected program costs per fixture (including marketing and administration) and per AF of water savings are shown below.

Customer Class	Program Cost ($/Rebate)	Water Savings ($/AF)
Single Family	$150	$440
Multi Family	$130	$220
Non-Residential	$250	$720

*Costs rounded to nearest $10.

Year	Annual Program Cost
2011	$109,100
2012	$109,100
2013	$109,100
2014	$60,800
2015	$60,800
Five-Year Cost	$448,900

*Annual cost rounded to nearest $100.

WATER SAVINGS

Fixture and Program Savings: Projected water savings per fixture vary by customer class. Projected savings per fixture, and annual and lifetime program water savings are shown below.

Customer Class	Unit Savings (gal/yr)	Lifetime Savings (AF/Rebate)
Single Family	9,000	0.6
Multi Family	16,400	1.0
Non-Residential	9,600	0.6

*Unit savings rounded to nearest 100 gal.

Year	Water Savings (AF)
2011	24.9
2012	48.8
2013	71.7
2014	87.2
2015	102.1
5-Year Total Savings	334.7

High Efficiency Clothes Washer Rebate Program

Stockton District

Program Description

Washing clothes is the second biggest use of water inside most homes, accounting for approximately 20% of indoor water use for a typical family. High-efficiency clothes washers can cut this water use by up to 60%, and save a significant amount of energy too. Unfortunately, many households and businesses are still purchasing low-efficiency washers because of their lower up-front purchase cost. Rebates are an effective way to level the playing field.

This program will provide customer incentives for residential and non-residential high-efficiency clothes washers. The program will target single-family households, multi-family units, multi-family common laundry areas, and commercial coin-op laundries.

Cal Water will centrally administer the program as part of a company-wide toilet rebate program.

Program Marketing

This program will be available to all residential and non-residential customers. Cal Water will market the program through direct mail, print media, bill stuffers, and its website. Expected program participation levels (rounded up to nearest 10 units) are shown in the table below.

Year	Rebate Goal
2011	200
2012	200
2013	190
2014	170
2015	170

*Combined rebates for single family, multi family, and commercial customers.

IMPLEMENTATION COST

Costs per Rebate and per AF of Water Savings: Program costs vary by fixture type and customer class. Expected program costs per rebate (including marketing and administration) and per AF of water savings are shown below.

Washer Location	Program Cost ($/Rebate)	Water Savings ($/AF)
Single Family	$170	$1,200
Multi Family - In Unit	$170	$1,640
Multi Family - Common	$460	$960
Commercial Coin-op	$460	$770

Year	Annual Program Cost
2011	$45,200
2012	$45,200
2013	$38,000
2014	$28,600
2015	$28,600
Five-Year Cost	**$185,600**

*Annual cost rounded to nearest $100.

WATER SAVINGS

Fixture and Program Savings: Projected water savings per fixture vary by customer class. Projected savings per fixture, and annual and lifetime program water savings are shown below.

Customer Class	Unit Savings (gal/yr)	Lifetime Savings (AF/Rebate)
Single Family	7,100	0.3
Multi Family - In Unit	5,200	0.2
Multi Family - Common	25,300	1.1
Commercial Coin-op	31,400	1.3

Year	Water Savings (AF)
2011	5.9
2012	11.5
2013	15.7
2014	17.9
2015	20.0
Total Five-Year Savings	**71.0**

Toilet/Urinal Direct Install Program

Stockton District

Program Description

High-efficiency toilets and urinals use significantly less water than non-efficient models. This program will offer direct installation of high-efficiency toilets and urinals to Cal Water residential and commercial customers. The program will primarily target multi-family and commercial properties with older plumbing fixtures, where water savings potential is greatest.

Residential direct installations will include high-efficiency showerhead replacement and bathroom faucet aerators, in addition to toilet replacement. On the commercial side, the program will replace non-efficient toilets and flush valves for both toilets and urinals.

Cal Water will centrally administer the program as part of a company-wide program.

Program Marketing

Cal Water will market this program primarily to multi-family and commercial properties with older plumbing fixtures using direct mail. Expected program participation levels (rounded up to nearest 10 units) are shown in the table to the right.

Year	Program Production Goal
2011	430
2012	430
2013	430
2014	510
2015	510

*Combined goal for single family, multi family, and commercial direct installations.

IMPLEMENTATION COST

Costs Per Rebate and Per AF of Water Savings: Program costs vary by fixture type and customer class. Expected program costs per fixture (including marketing and administration) and per AF of water savings are shown below.

Customer Class/ Fixture	Program Cost ($/Install)	Water Savings ($/AF)
Single Family	$400	$1,030
Multi Family	$270	$370
Comm. Toilet	$500	$1,200
Comm. Urinal	$240	$1,030

*Rounded to nearest $10.

Year	Annual Program Cost
2011	$125,700
2012	$125,700
2013	$125,700
2014	$147,500
2015	$147,500
Five-Year Cost	**$672,100**

*Annual cost rounded to nearest $100.

WATER SAVINGS

Fixture and Program Savings: Projected annual and lifetime water savings per fixture and for the five-year program are shown below.

Customer Class/ Fixture	Unit Savings (gal/yr)	Lifetime Savings (AF/Installation)
Single Family	10,700	0.7
Multi Family	19,500	1.2
Comm. Toilet	11,400	0.7
Comm. Urinal	6,200	0.4

*Unit savings rounded to nearest 100 gal.

Year	Program Water Savings (AF)
2011	22.3
2012	43.6
2013	64.1
2014	88.7
2015	112.3
Five-Year Total Savings	**331.0**

Residential & Commercial Survey Program

Stockton District

Program Description

This program will provide residential and non-residential water use surveys to Cal Water customers. Residential surveys will evaluate a customer's indoor and outdoor water use and provide information on how to reduce household water use. Customers will receive a report with specific water saving recommendations as well as information on available Cal Water conservation rebate programs that may benefit them. Multi family and commercial surveys will be used to assist high-bill customers, as well as to screen potential properties for the bathroom fixture direct installation program (if available in the district).

Surveys will be conducted by trained professionals. Cal Water will centrally administer the program as part of a company-wide program.

Program Marketing

This program will be available to all residential and non-residential customers. Cal Water will market the program through direct mail, print media, bill stuffers, and its website. Expected program participation levels (rounded up to nearest 10 units) are shown in the table to the right.

Year	Survey Goal
2011	120
2012	120
2013	120
2014	110
2015	110

*Combined surveys for single family, multi family, and commercial customers.

IMPLEMENTATION COST

Costs Per Rebate and Per AF of Water Savings: Program costs vary by fixture type and customer class. Expected program costs per fixture (including marketing and administration) and per AF of water savings are shown below.

Customer Class	Program Cost ($/Survey)	Water Savings ($/AF)
Single Family	$210	$1,470
Multi Family	$1,430	$1,240
Non-Residential	$1,070	$1,440

*Cost rounded to nearest dollar. Water savings cost rounded to nearest $10. Multi family program cost is per property complex.

Year	Annual Program Cost
2011	$35,100
2012	$34,900
2013	$42,000
2014	$31,600
2015	$31,600
Five-Year Cost	**$175,200**

*Annual cost rounded to nearest $100.

WATER SAVINGS

Fixture and Program Savings: Projected water savings per fixture vary by customer class. Projected savings per fixture, and annual and lifetime program water savings are shown below.

Customer Class	Unit Savings (gal/yr)	Lifetime Savings (AF/Survey)
Single Family	12,300	0.2
Multi Family	98,300	1.2
Non-Residential	42,300	0.5

*Unit savings rounded to nearest 100 gal/yr.

Year	Water Savings (AF)
2011	5.7
2012	10.8
2013	16.7
2014	20.0
2015	23.0
Five-Year Savings	**76.2**

Residential Conservation Kit Distribution Program

Stockton District

Program Description

This program will offer Cal Water residential customers conservation kits featuring a range of water-saving plumbing retrofit fixtures. Kits will be available at no charge to customers, who can request them via Cal Water's website, via mail, or by contacting or visiting their district.

Each kit can include up to two of each of the following items: high-efficiency showerhead, kitchen faucet aerator, bathroom faucet aerator, full-stop hose nozzle, and toilet leak detection tablets. Customers may customize items and quantities included in their kit.

Cal Water will centrally administer this program as part of a company-wide program operated in each of its 24 service districts.

Year	Kits Distributed
2011	1,190
2012	1,190
2013	1,190
2014	350
2015	350

Program Marketing

This program will be available to all residential customers. Cal Water will market the program through direct mail, print media, bill stuffers, and through its website. Expected program participation levels (rounded up to nearest 10 units) are shown in the table to the right.

IMPLEMENTATION COST

Costs Per Nozzle and Per AF of Water Savings: Bulk purchasing will help keep program costs low. Kit distribution costs about $29/kit, including the costs for the kit, marketing, and administration.

Fixture	Program Cost ($/Kit)	Water Savings ($/AF)
Residential Conservation Kit	$29	$550

*Water savings cost rounded to nearest $10.

Year	Annual Program Cost
2011	$36,200
2012	$36,200
2013	$36,200
2014	$10,700
2015	$10,700
Five-Year Cost	**$130,000**

*Annual cost rounded to nearest $100.

WATER SAVINGS

Kit and Program Savings: Projected savings per kit are based on prior program experience and assume a 50% to 60% installation rate for each device included in the kit. Annual and lifetime savings per kit and for the five-year program are shown below.

Fixture	Unit Savings (gal/yr)	Lifetime Savings (gal/Kit)
Residential Conservation Kit	5,100	25,500

*Unit savings rounded to nearest 100 gal/yr. Savings assumed to last five years.

Year	Water Savings (AF)
2011	18.6
2012	34.9
2013	49.3
2014	48.8
2015	48.4
Five-Year Total Savings	**200.0**

Sprinkler Nozzle Distribution Program

Stockton District

Program Description

Water efficient sprinkler nozzles use up to 20% less water than a standard sprinkler head by distributing water more slowly and uniformly to the landscape. In addition to reducing water use, water directed from these nozzles reduces run-off onto streets and sidewalks with a more directed flow.

Customers will be able to obtain the nozzles either directly through Cal Water or via a web-voucher program. Restrictions on the number of nozzles individual customers may receive will vary by customer class and/or landscape size.

Cal Water will centrally administer this program as part of a company-wide program operated in each of its 24 service districts.

Program Marketing

This program will be available to all residential and non-residential customers. Cal Water will market the program through direct mail, print media, bill stuffers, and its website. Expected program participation levels (rounded up to nearest 10 units) are shown in the table to the right.

Year	Nozzles Distributed
2011	22,200
2012	22,200
2013	22,200
2014	22,200
2015	22,200

IMPLEMENTATION COST

Costs Per Nozzle and Per AF of Water Savings: Bulk purchasing will help keep program costs low. Nozzles are expected to cost about $3/nozzle. Program marketing and administration is estimated at under $1/nozzle.

Fixture	Program Cost ($/Nozzle)	Water Savings ($/AF)
Sprinkler Nozzle	$4	$190

*Fixture cost rounded to nearest dollar. Water savings cost rounded to nearest $10.

Year	Annual Program Cost
2011	$82,300
2012	$82,300
2013	$82,300
2014	$82,300
2015	$82,300
Five-Year Cost	**$411,500**

*Annual cost rounded to nearest $100.

WATER SAVINGS

Nozzle and Program Savings: Projected savings per nozzle, and annual and lifetime program water savings are shown below. These estimates are based on Metropolitan Water District's Save Water-Save A Buck program estimates.

Fixture	Unit Savings (gal/yr)	Lifetime Savings (gal)
Sprinkler Nozzle	1,300	6,500

*Unit savings rounded to nearest 100 gal/yr. Nozzles assumed to have a five-year useful life.

Year	Water Savings (AF)
2011	88.8
2012	177.5
2013	266.3
2014	355.1
2015	443.9
Five-Year Total Savings	**1,331.6**

Smart Irrigation Controller Distribution Program

Stockton District

Program Description

Weather-based "smart" irrigation controllers allow for more accurate, customized irrigation by automatically adjusting the schedule and amount of water in response to changing weather conditions. Empirical studies have shown savings of 15% to 25% of irrigation water use.

This program will target residential and non-residential customers with high landscape water use. The program will offer incentives to either the customer or contractor for proper installation of the Smart Controller at customer sites.

The landscape contractor has the direct relationship with customers and is typically the entity customers listen to when making landscape and irrigation decisions. The program will educate contractors about the customer benefits of Smart Controllers along with proper installation of the devices.

Program Marketing

This program will be offered to all residential and non-residential customers. Cal Water will market the program through direct mail, print media, bill stuffers, and its website. Expected program participation levels (rounded up to nearest 10 units) are shown in the table to the right.

Year	Distribution Goal
2011	10
2012	10
2013	10
2014	10
2015	10

IMPLEMENTATION COST

Costs Per Rebate and Per AF of Water Savings: Program costs vary by rebate and customer class. Expected program costs per rebate (including marketing and administration) and per AF of water savings are shown below.

Customer Class	Program Cost ($/Rebate)	Water Savings ($/AF)
Single Family	$480	NA
Multi Family	$480	$990
Non-Residential	$480	$990

*Rebate cost rounded to nearest dollar. Water savings cost rounded to nearest $10.

Year	Annual Program Cost
2011	$800
2012	$800
2013	$800
2014	$800
2015	$800
Five-Year Cost	**$4,000**

*Annual cost rounded to nearest $100.

WATER SAVINGS

Rebate and Program Savings: Projected water savings per rebate vary by customer class. Projected savings per rebate, and annual and lifetime program water savings are shown below.

Customer Class	Unit Savings (gal/yr)	Lifetime Savings (AF/Rebate)
Single Family	9,900	0.3
Multi Family	17,800	0.5
Non-Residential	17,800	0.5

*Unit savings rounded to nearest 100 gal/yr.

Year	Water Savings (AF)
2011	0.1
2012	0.2
2013	0.2
2014	0.3
2015	0.4
Five-Year Total Savings	**1.2**

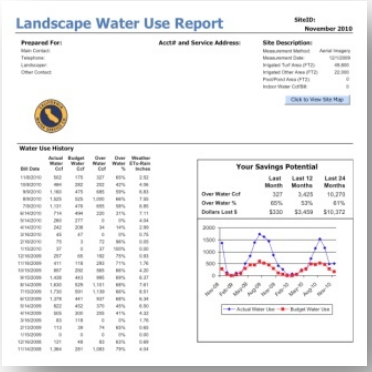
Large Landscape Water Use Report Program

Stockton District

Program Description

A landscape water budget calculates the recommended amount of water for irrigation based on landscape size, plant mix, weather, and season. Empirical studies have shown that providing customers with landscape budgets can reduce irrigation water use by 10% to 20%.

This program will provide participating large landscape customers monthly reports comparing actual landscape water use to their budget. The reports will show whether irrigation is excessive and how much the customer's water costs could fall by irrigating more efficiently. Customers having trouble staying within budget may request a large landscape site evaluation and may be eligible for landscape equipment incentives.



Program Marketing

Cal Water is already implementing this program in several districts. The program will be expanded to more customers in these districts and extended to other districts. Satellite imagery and billing data are used to identify good candidates for the program. Expected program participation levels (rounded up to nearest 10 units) are shown in the table to the right.

Year	Participating Large Landscapes
2011	60
2012	60
2013	60
2014	150
2015	150

IMPLEMENTATION COST

Costs per Property and per AF of Water Savings: Expected program costs per property (including marketing and administration) and per AF of water savings are shown below. Costs per property include the amortized one-time cost to measure the property's landscape area and set up the budget.

Customer Type	Program Cost ($/Yr/Property)	Water Savings ($/AF)
Customers with Significant Landscape Area	$60	$630

*rounded to nearest $10.

Year	Annual Program Cost
2011	$4,100
2012	$4,100
2013	$4,100
2014	$10,200
2015	$10,200
Five-Year Cost	**$32,700**

*Annual cost rounded to nearest $100.

WATER SAVINGS

Program Savings: Projected average annual and lifetime water savings per property are shown below. Cumulative program water savings over five-years are also shown.

Customer Type	Unit Savings (gal/yr)	Lifetime Savings (AF)
Customers with Significant Landscape Area	35,400	2.7

*Unit savings rounded to nearest 100 gallons. Lifetime savings calculated

Year	Water Savings (AF)
2011	6.5
2012	6.5
2013	6.5
2014	16.3
2015	16.3
Five-Year Total Savings	**52.1**

Large Landscape Surveys

Stockton District

Program Description

This program will provide landscape water use evaluations, recommendations, and education to commercial and industrial customers with significant landscaped area.

Participating customers will receive a detailed assessment of the water use efficiency of their current landscape and irrigation system. Participants will receive a report summarizing the results of the assessment and recommended changes to irrigation systems and practices.

Program Marketing

Cal Water is already implementing this program in several districts. The program will be expanded to more customers in these districts and extended to other districts. This program will target HOA, apartment complex, commercial, and industrial properties with significant landscape water use. Customers participating in Cal Water's Landscape Water Use Report program will be the primary targets for program participation. Expected program participation levels (rounded up to nearest 10 units) are shown in the table to the right.

Year	Participating Large Landscapes
2011	10
2012	10
2013	10
2014	10
2015	10

IMPLEMENTATION COST

Costs per Property and per AF of Water Savings: Expected program costs per survey (including marketing and administration) and per AF of water savings are shown below.

Target Participant	Program Cost ($/Survey)	Water Savings ($/AF)
Customers with Significant Landscape Area	$1,400	$810

*rounded to nearest $10.

Year	Annual Program Cost
2011	$11,800
2012	$11,800
2013	$11,800
2014	$4,400
2015	$4,400
Five-Year Cost	**$44,200**

*Annual cost rounded to nearest $100.

WATER SAVINGS

Program Savings: Projected average annual and lifetime water savings per survey are shown below. Cumulative program water savings over five-years are also shown.

Target Participant	Unit Savings (gal/yr)	Lifetime Savings (AF/Survey)
Customers with Significant Landscape Area	121,600	1.9

*Unit savings rounded to nearest 100 gallons.

Year	Water Savings (AF)
2011	3.0
2012	6.0
2013	9.0
2014	10.1
2015	11.2
Five-Year Total Savings	**39.3**

Irrigation System Rebates

Stockton District

Program Description

This program will provide customized irrigation system rebates to commercial and industrial customers with significant landscaped area.

Participating customers can receive rebates on a variety of irrigation system equipment and changes to landscape, including commercial-grade weather-based controllers, rotating sprinkler nozzles, and replacement of turf or other high-water use landscape with climate-appropriate low-water use landscape. Eligibility and rebate amounts will be determined on a customer-by-customer basis.

Program Marketing

This program will target HOA, apartment complex, commercial, and industrial properties with significant landscape water use. The program will be marketed primarily through direct mail and via landscape contractor networks. Expected program participation levels (rounded up to nearest 10 units) are shown in the table to the right.

Year	Participating Customers
2011	90
2012	90
2013	90
2014	90
2015	90

IMPLEMENTATION COST

Costs per Rebate and per AF of Water Savings: Expected program costs per rebate (including marketing and administration) and per AF of water savings are shown below. Individual rebate amounts will vary by participant. The amount shown below is the average rebate amount across all expected participants.

Target Participant	Program Cost ($/Rebate)	Water Savings ($/AF)
Customers with Significant Landscape Area	$520	$320

*rounded to nearest $10.

Year	Annual Program Cost
2011	$47,100
2012	$47,100
2013	$47,100
2014	$47,100
2015	$47,100
Five-Year Cost	**$235,500**

*Annual cost rounded to nearest $100.

WATER SAVINGS

Program Savings: Projected average annual and lifetime water savings per rebate are shown below. Cumulative program water savings over five-years are also shown.

Target Participant	Unit Savings (gal/yr)	Lifetime Savings (AF/Rebate)
Customers with Significant Landscape Area	60,800	1.9

*Unit savings rounded to nearest 100 gallons.

Year	Water Savings (AF)
2011	16.2
2012	32.5
2013	48.7
2014	65.0
2015	81.2
Five-Year Total Savings	**243.6**

Commercial Kitchen Rebate Program

Stockton District

Program Description

Potential water savings in commercial kitchens are significant. However, financial barriers often prevent these facilities from taking simple steps to improve water use efficiency.

This program will provide financial incentives for high-efficiency commercial dishwashers, food steamers, ice machines, and pre-rinse spray valves. The program will target commercial and institutional customers with significant kitchen water use.

Cal Water will centrally administer the program. The program will be offered in all Cal Water Districts starting in 2014.

Program Marketing

Cal Water will market this program through direct mail campaigns and its website. Commercial customers with significant kitchen water use participating in Cal Water's commercial survey program will be directed to the program as well. Expected program participation levels (rounded up to nearest 10 units) are shown in the table to the right.

Year	Rebate Goal
2011	0
2012	0
2013	0
2014	30
2015	30

IMPLEMENTATION COST

Costs per Rebate and per AF of Water Savings: Expected program costs per rebate (including marketing and administration) and per AF of water savings are shown below.

Customer Target	Program Cost ($/Rebate)*	Water Savings ($/AF)*
Commercial Kitchens	$780	$300

*Rounded to nearest $10. Average cost per rebate or AF based on expected mix of devices rebated.

Year	Annual Program Cost
2011	$ 0
2012	$ 0
2013	$ 0
2014	$18,900
2015	$18,900
Five-Year Cost	**$37,800**

*Annual cost rounded to nearest $100.

WATER SAVINGS

Fixture and Program Savings: Projected annual and lifetime water savings per fixture and from program implementation are shown below.

Customer Target	Unit Savings (gal/yr)*	Lifetime Savings (AF/Rebate)
Commercial Kitchens	101,100	3.1

*Rounded to nearest 100 gallons. Average for expected mix of devices rebated.

Year	Water Savings (AF)
2011	0.0
2012	0.0
2013	0.0
2014	7.5
2015	15.0
Five-Year Total Savings	**22.5**

Appendix 2
Conservation Program Modeling Results

Table A- 1. Stockton District Minimum Activity Level Constraints

Activity ID	Activity Name	Customer Class	2011	2012	2013	2014	2015
1	HE Toilets: Cust Rebates or Vouchers	Single Family	80	80	80	80	80
2	HE Toilets: Cust Rebates or Vouchers	Multi Family	32	32	32	32	32
3	HE Toilets: Cust Rebates or Vouchers	Commercial	38	38	38	38	38
4	Clotheswasher: Cust Reb or Voucher	Single Family	135	135	135	135	135
5	CW common: Cust Reb or Voucher	Multi Family	1	1	1	1	1
6	CW in-unit: Cust Reb or Voucher	Multi Family	25	25	25	25	25
7	CW coin-op: Cust Reb or Voucher	Commercial	1	1	1	1	1
8	Urinals (0.25 gpf): Cust Rebates or Vouchers	Commercial	0	0	0	0	0
9	HE Toilets: Direct Install	Single Family	53	53	53	53	53
10	HE Toilets: Direct Install	Multi Family	25	25	25	25	25
11	HE Toilets: Direct Install	Commercial	26	26	26	26	26
12	Urinals: Direct Install	Commercial	25	25	25	25	25
13	Audits & Surveys (incl high bill contacts)	Single Family	100	100	100	100	100
14	Audits & Surveys (incl high bill contacts)	Multi Family	1	1	1	1	1
15	Audits & Surveys (incl high bill contacts)	Commercial	8	8	8	8	8
16	High Efficiency Pop-Up Nozzle Web Voucher	Single Family	5,550	5,550	5,550	5,550	5,550
17	High Efficiency Pop-Up Nozzle Web Voucher	Multi Family	925	925	925	925	925
18	High Efficiency Pop-Up Nozzle Web Voucher	Commercial	925	925	925	925	925
19	Showerhead/Aerator,Tablet Kit Dist	Single Family	297	297	297	297	297
20	Showerhead/Aerator,Tablet Kit Dist	Multi Family	53	53	53	53	53
21	WBIC Vendor, Dist, & Cont Inc	Single Family	0	0	0	0	0
22	WBIC Vendor, Dist, & Cont Inc	Multi Family	0	0	0	0	0
23	WBIC Vendor, Dist, & Cont Inc	Commercial	1	1	1	1	1
24	Large Landscape Water Use Reports	Irrigation	60	60	60	150	150
25	Lg Lndscp Surveys & Irrig Sys: Rebates	Irrigation	3	3	3	3	3
26	Comm Irrigation System: Rebates	Commercial	14	14	14	14	14
27	Dishwashers: Vendor, Dist & Cont Inc	Commercial	0	0	0	3	3
28	Food Steamers: Cust Rebates	Commercial	0	0	0	1	1
29	Ice Machines: Cust Rebates	Commercial	0	0	0	1	1
30	Pre-Rinse Spray Valves: Cust rebates	Commercial	0	0	0	1	1
31	Cooling Tower Cond Cont: Cust Reb, Inc	Industrial	0	0	0	0	0
32	Cooling Tower pH Cont: Cust Reb, Inc	Industrial	0	0	0	0	0
33	Industrial Process: Audits & Incentives	Industrial	0	0	0	0	0

Table A- 2. Stockton District Maximum Activity Level Constraints

Activity ID	Activity Name	Customer Class	2011	2012	2013	2014	2015
1	HE Toilets: Cust Rebates or Vouchers	Single Family	498	498	498	749	749
2	HE Toilets: Cust Rebates or Vouchers	Multi Family	199	199	199	300	300
3	HE Toilets: Cust Rebates or Vouchers	Commercial	240	240	240	360	360
4	Clotheswasher: Cust Reb or Voucher	Single Family	542	542	542	723	723
5	CW common: Cust Reb or Voucher	Multi Family	24	24	24	24	24
6	CW in-unit: Cust Reb or Voucher	Multi Family	99	99	99	99	99
7	CW coin-op: Cust Reb or Voucher	Commercial	14	14	14	14	14
8	Urinals (0.25 gpf): Cust Rebates or Vouchers	Commercial	0	0	0	0	0
9	HE Toilets: Direct Install	Single Family	797	797	797	999	999
10	HE Toilets: Direct Install	Multi Family	320	320	320	401	401
11	HE Toilets: Direct Install	Commercial	384	384	384	481	481
12	Urinals: Direct Install	Commercial	652	652	652	652	652
13	Audits & Surveys (incl high bill contacts)	Single Family	543	543	543	813	813
14	Audits & Surveys (incl high bill contacts)	Multi Family	9	9	9	13	13
15	Audits & Surveys (incl high bill contacts)	Commercial	98	98	98	147	147
16	High Efficiency Pop-Up Nozzle Web Voucher	Single Family	16,650	16,650	16,650	16,650	16,650
17	High Efficiency Pop-Up Nozzle Web Voucher	Multi Family	2,775	2,775	2,775	2,775	2,775
18	High Efficiency Pop-Up Nozzle Web Voucher	Commercial	2,775	2,775	2,775	2,775	2,775
19	Showerhead/Aerator,Tablet Kit Dist	Single Family	1,062	1,062	1,062	1,062	1,062
20	Showerhead/Aerator,Tablet Kit Dist	Multi Family	126	126	126	126	126
21	WBIC Vendor, Dist, & Cont Inc	Single Family	406	406	406	609	609
22	WBIC Vendor, Dist, & Cont Inc	Multi Family	5	5	5	8	8
23	WBIC Vendor, Dist, & Cont Inc	Commercial	29	29	29	44	44
24	Large Landscape Water Use Reports	Irrigation	150	150	150	150	150
25	Lg Lndscp Surveys & Irrig Sys: Rebates	Irrigation	8	8	8	8	8
26	Comm Irrigation System: Rebates	Commercial	87	87	87	87	87
27	Dishwashers: Vendor, Dist & Cont Inc	Commercial	0	0	0	14	14
28	Food Steamers: Cust Rebates	Commercial	0	0	0	7	1
29	Ice Machines: Cust Rebates	Commercial	0	0	0	5	5
30	Pre-Rinse Spray Valves: Cust rebates	Commercial	0	0	0	4	4
31	Cooling Tower Cond Cont: Cust Reb, Inc	Industrial	0	0	0	0	0
32	Cooling Tower pH Cont: Cust Reb, Inc	Industrial	0	0	0	0	0
33	Industrial Process: Audits & Incentives	Industrial	0	0	0	0	0

Table A- 3. Stockton District Program Savings and Cost Assumptions

Activity ID	Activity Name	Customer Class	Unit Savings (gal/yr)	Useful Life (yrs)	Free Riders (%)	Unit Costs ($)	Annual Natural Replacement Rate (%)
1	HE Toilets: Cust Rebates or Vouchers	Single Family	9,002 ---------- Based on toilet savings formula in CUWCC Costs & Savings Study. Varies with persons per household Assumes that replaced toilets are 25% ULFTs, 75% non ULFTS.	25		$140.00 ---------- $100 rebate + $40 administration	4.00%
2	HE Toilets: Cust Rebates or Vouchers	Multi Family	16,368 ---------- Based on toilet savings formula in CUWCC Costs & Savings Study. Varies with persons per household Assumes that replaced toilets are 25% ULFTs, 75% non ULFTS.	25		$125.00 ---------- $100 rebate + $25 administration	4.00%
3	HE Toilets: Cust Rebates or Vouchers	Commercial	9,559 ---------- CUWCC CII Toilet Savings Study and Zip Code Toilet Inventory. Assumes 25% of replaced toilets are ULFTs and 75% are not ULFTs.	25		$240.00 ---------- $200 rebate + $40 administration	4.00%
4	Clotheswasher: Cust Reb or Voucher	Single Family	7,079 ---------- CUWCC Cost and Savings Study, revised 2005.	12	20%	$165.00 ---------- $125 rebate + $40 administration	4.00%
5	CW common: Cust Reb or Voucher	Multi Family	25,310 ---------- Alliance for Water Efficiency Guide, p. 136.	8		$440.00 ---------- $400 rebate + $40 administration	4.17%
6	CW in-unit: Cust Reb or Voucher	Multi Family	5,244 ---------- CUWCC Cost and Savings Study, revised 2005.	12	20%	$165.00 ---------- $125 rebate + $40 administration	4.17%
7	CW coin-op: Cust Reb or Voucher	Commercial	31,435 ---------- Alliance for Water Efficiency Guide, p. 159.	8		$440.00 ---------- $400 rebate + $40 administration	4.17%
8	Urinals (0.25 gpf): Cust Rebates or Vouchers	Commercial	9,310 ---------- Savings estimate for 0.5 gpf urinal from Alliance for Water Efficiency Library. Savings for 0.25 gpf urinal is 1.5 x the AWE figure.	25		$340.00 ---------- $300 rebate + $40 administration	4.00%
9	HE Toilets: Direct Install	Single Family	10,728 ---------- Based on toilet savings formula in CUWCC Costs & Savings Study. Varies with persons per household. Based on Cal Water's existing direct install program, assumes that replaced toilets are 10% ULFTs, 50% 5 gpf and 40% 3.5 gpf.	25		$384.50 ---------- Based on Cal Water program experience.	4.00%
10	HE Toilets: Direct Install	Multi Family	19,505 ---------- Based on toilet savings formula in CUWCC Costs & Savings Study. Varies with persons per household. Based on Cal Water's existing direct install program, assumes that replaced toilets are 10% ULFTs, 50% 5 gpf and 40% 3.5 gpf.	25		$254.50 ---------- Based on Cal Water program experience.	4.00%
11	HE Toilets: Direct Install	Commercial	11,391 ---------- Based on toilet savings formula in CUWCC Costs & Savings Study. Varies with persons per household. Based on Cal Water's existing direct install program, assumes that replaced toilets are 10% ULFTs, 50% 5 gpf and 40% 3.5 gpf.	25		$479.50 ---------- Based on Cal Water program experience.	4.00%
12	Urinals: Direct Install	Commercial	6,207 ---------- Alliance for Water Efficiency Library.	25		$224.50 Based on experience of other water utilities.	4.00%

13	Audits & Surveys	Single Family	11,753 ---------- Chesnutt, T.W., C. N. McSpadden, and D. M. Pekelney, "What is the Reliable Yield from Residential Home Water Survey Programs? The Experience of the Los Angeles Department of Water and Power", Proceedings of the American Water Works Association Conference in Anaheim, June 1995.	5		$201.50 ---------- Whitcomb, J. Residential Water Survey Evaluation, Contra Costa Water District, May 2000	
14	Audits & Surveys	Multi Family	93,598 ---------- Assumes 5% of per-acct usage	5		$1,358.00 ---------- Based on $56 per AF of annual per-acct usage.	
15	Audits & Surveys	Commercial	40,257 ---------- Based on AWWARF, *Water Use Efficiency in IRP*, pg 155-58, CII typical survey savings potential is around 15%. Assuming half of recommended conservation activiies are complfeted, this results in 7.5% savings per audit.	10		$1,016.50 ---------- Based on AWWARF, Water Use Efficiency in IRP, pg 155-58,	
16	High Efficiency Pop-Up Nozzle Web Voucher	Single Family	1,303 ---------- Source: MWDSC Save Water - Save A Buck program assumptions.	5		$3.53 ---------- $3 per nozzle material cost + $0.5 per nozzle marketing cost + $0.03 per nozzle to cover fixed setup costs.	
17	High Efficiency Pop-Up Nozzle Web Voucher	Multi Family	1,303 ---------- Source: MWDSC Save Water - Save A Buck program assumptions.	5		$3.53 ---------- $3 per nozzle material cost + $0.5 per nozzle marketing cost + $0.03 per nozzle to cover fixed setup costs.	
18	High Efficiency Pop-Up Nozzle Web Voucher	Commercial	1,303 ---------- Source: MWDSC Save Water - Save A Buck program assumptions.	5		$3.53 ---------- $3 per nozzle material cost + $0.5 per nozzle marketing cost + $0.03 per nozzle to cover fixed setup costs.	
19	Showerhead/Aerator,Tablet Kit Dist	Single Family	5,091 ---------- Based on Cal Water program experience: 2,628 gpy showerhead 821 gpy kitchen aerator 1,642 gpy bathroom aerator	5		$29.00 ---------- Based on Cal Water program experience: $26 for kit + $3 for marketing	12.00%
20	Showerhead/Aerator,Tablet Kit Dist	Multi Family	5,091 ---------- Based on Cal Water program experience: 2,628 gpy showerhead 821 gpy kitchen aerator 1,642 gpy bathroom aerator	5		$29.00 ---------- Based on Cal Water program experience: $26 for kit + $3 for marketing	12.00%
21	WBIC Vendor, Dist, & Cont Inc	Single Family	9,929 ---------- Based on district-specific landscape savings model.	10		$460.00 ---------- Required vendor incentive assumed to be less than estimated $530 customer rebate.	
22	WBIC Vendor, Dist, & Cont Inc	Multi Family	17,777 ---------- Based on district-specific landscape savings model.	10		$460.00 ---------- Required vendor incentive assumed to be less than estimated $530 customer rebate.	

23	WBIC Vendor, Dist, & Cont Inc	Commercial	17,777 Based on district-specific landscape savings model.	10		$460.00 ---------- Required vendor incentive assumed to be less than estimated $530 customer rebate.	
24	Large Landscape Water Use Reports	Irrigation	35,396 ---------- Based on district-specific landscape savings model.	1		$64.99 ---------- Set up cost of $142 amortized over 10 years, plus $48/year report cost.	
25	Lg Lndscp Surveys & Irrig Sys: Rebates	Irrigation	121,644 ---------- Based on district-specific landscape savings model.	5		$1,400.00	
26	Comm Irrigation System: Rebates	Commercial	60,822 ---------- Based on district-specific landscape savings model.	10		$515.00	
27	Dishwashers: Vendor, Dist & Cont Inc	Commercial	57,757 ---------- Source: Alliance for Water Efficiency Library	20		$330.00 ---------- Source: Alliance for Water Efficiency Library. Incentive is half the cost difference between conventional and water-efficient machines.	
28	Food Steamers: Cust Rebates	Commercial	81,407 ---------- Source: MOU pp. 45-46.	10		$2,411.00 ---------- Half of average fixture cost from industry sources + marketing + admin cost	
29	Ice Machines: Cust Rebates	Commercial	271,739 ---------- Source: MOU pp. 45-46.	10		$1,985.00 ---------- Half of fixture cost in CUWCC PBMP Year 2 Report + admin + mktg	
30	Pre-Rinse Spray Valves: Cust rebates	Commercial	28,285 Industry sources	5		$110.00 Half of estimated fixture cost + admin	
31	Cooling Tower Cond Cont: Cust Reb, Inc	Industrial	336,129 ---------- Source: MOU pp. 45-46.	5		$1,000.00 ---------- Based on Cal Water program experience.	
32	Cooling Tower pH Cont: Cust Reb, Inc	Industrial	1,296,502 ---------- Source: MOU pp. 45-46.	5		$3,810.00 Industry data + admin costs	
33	Industrial Process: Audits & Incentives	Industrial	325,851 ---------- Activity levels and costs expressed relative to AF of savings.	5		$1,282.80 ---------- Based on experience of other water utilities. Includes cost of audit + rebate per AF savings	

Table A- 4. Stockton District Program Activity Levels

Activity ID	Program	Class	Annual Activity Levels				
			2011	2012	2013	2014	2015
1	HE Toilets: Cust Rebates or Vouchers	Single Family	498	498	498	80	80
2	HE Toilets: Cust Rebates or Vouchers	Multi Family	199	199	199	300	300
3	HE Toilets: Cust Rebates or Vouchers	Commercial	38	38	38	38	38
4	Clotheswasher: Cust Reb or Voucher	Single Family	135	135	135	135	135
5	CW common: Cust Reb or Voucher	Multi Family	24	24	9	1	1
6	CW in-unit: Cust Reb or Voucher	Multi Family	25	25	25	25	25
7	CW coin-op: Cust Reb or Voucher	Commercial	14	14	14	1	1
8	Urinals (0.25 gpf): Cust Rebates or Vouchers	Commercial	0	0	0	0	0
9	HE Toilets: Direct Install	Single Family	53	53	53	53	53
10	HE Toilets: Direct Install	Multi Family	320	320	320	401	401
11	HE Toilets: Direct Install	Commercial	26	26	26	26	26
12	Urinals: Direct Install	Commercial	25	25	25	25	25
13	Audits & Surveys (incl high bill contacts)	Single Family	100	100	100	100	100
14	Audits & Surveys (incl high bill contacts)	Multi Family	4	4	9	1	1
15	Audits & Surveys (incl high bill contacts)	Commercial	8	8	8	8	8
16	High Efficiency Pop-Up Nozzle Web Voucher	Single Family	16,650	16,650	16,650	16,650	16,650
17	High Efficiency Pop-Up Nozzle Web Voucher	Multi Family	2,775	2,775	2,775	2,775	2,775
18	High Efficiency Pop-Up Nozzle Web Voucher	Commercial	2,775	2,775	2,775	2,775	2,775
19	Showerhead/Aerator,Tablet Kit Dist	Single Family	1,062	1,062	1,062	297	297
20	Showerhead/Aerator,Tablet Kit Dist	Multi Family	126	126	126	53	53
21	WBIC Vendor, Dist, & Cont Inc	Single Family	0	0	0	0	0
22	WBIC Vendor, Dist, & Cont Inc	Multi Family	0	0	0	0	0
23	WBIC Vendor, Dist, & Cont Inc	Commercial	1	1	1	1	1
24	Large Landscape Water Use Reports	Irrigation	60	60	60	150	150
25	Lg Lndscp Surveys & Irrig Sys: Rebates	Irrigation	8	8	8	3	3
26	Comm Irrigation System: Rebates	Commercial	87	87	87	87	87
27	Dishwashers: Vendor, Dist & Cont Inc	Commercial	0	0	0	14	14
28	Food Steamers: Cust Rebates	Commercial	0	0	0	1	1
29	Ice Machines: Cust Rebates	Commercial	0	0	0	5	5
30	Pre-Rinse Spray Valves: Cust rebates	Commercial	0	0	0	4	4
31	Cooling Tower Cond Cont: Cust Reb, Inc	Industrial	0	0	0	0	0
32	Cooling Tower pH Cont: Cust Reb, Inc	Industrial	0	0	0	0	0
33	Industrial Process: Audits & Incentives	Industrial	1	0	0	0	0

Table A- 5. Stockton District Program Costs

Activity ID	Program	Class	Annual Cost				
			2011	2012	2013	2014	2015
1	HE Toilets: Cust Rebates or Vouchers	Single Family	$69,720	$69,720	$69,720	$11,152	$11,152
2	HE Toilets: Cust Rebates or Vouchers	Multi Family	$24,875	$24,875	$24,875	$37,500	$37,500
3	HE Toilets: Cust Rebates or Vouchers	Commercial	$9,207	$9,207	$9,207	$9,207	$9,207
4	Clotheswasher: Cust Reb or Voucher	Single Family	$22,275	$22,275	$22,275	$22,275	$22,275
5	CW common: Cust Reb or Voucher	Multi Family	$10,630	$10,630	$3,849	$440	$440
6	CW in-unit: Cust Reb or Voucher	Multi Family	$4,066	$4,066	$4,066	$4,066	$4,066
7	CW coin-op: Cust Reb or Voucher	Commercial	$6,019	$6,019	$6,019	$440	$440
8	Urinals (0.25 gpf): Cust Rebates or Vouchers	Commercial	$0	$0	$0	$0	$0
9	HE Toilets: Direct Install	Single Family	$20,420	$20,420	$20,420	$20,420	$20,420
10	HE Toilets: Direct Install	Multi Family	$81,384	$81,384	$81,384	$102,110	$102,110
11	HE Toilets: Direct Install	Commercial	$12,263	$12,263	$12,263	$12,263	$12,263
12	Urinals: Direct Install	Commercial	$5,613	$5,613	$5,613	$5,613	$5,613
13	Audits & Surveys (incl high bill contacts)	Single Family	$20,150	$20,150	$20,150	$20,150	$20,150
14	Audits & Surveys (incl high bill contacts)	Multi Family	$5,130	$4,930	$11,711	$1,804	$1,804
15	Audits & Surveys (incl high bill contacts)	Commercial	$8,132	$8,132	$8,132	$8,132	$8,132
16	High Efficiency Pop-Up Nozzle Web Voucher	Single Family	$58,775	$58,775	$58,775	$58,775	$58,775
17	High Efficiency Pop-Up Nozzle Web Voucher	Multi Family	$9,796	$9,796	$9,796	$9,796	$9,796
18	High Efficiency Pop-Up Nozzle Web Voucher	Commercial	$9,796	$9,796	$9,796	$9,796	$9,796
19	Showerhead/Aerator,Tablet Kit Dist	Single Family	$30,798	$30,798	$30,798	$8,614	$8,614
20	Showerhead/Aerator,Tablet Kit Dist	Multi Family	$3,661	$3,661	$3,661	$1,536	$1,536
21	WBIC Vendor, Dist, & Cont Inc	Single Family	$0	$0	$0	$0	$0
22	WBIC Vendor, Dist, & Cont Inc	Multi Family	$103	$103	$103	$103	$103
23	WBIC Vendor, Dist, & Cont Inc	Commercial	$585	$585	$585	$585	$585
24	Large Landscape Water Use Reports	Irrigation	$3,899	$3,899	$3,899	$9,748	$9,748

Activity ID	Program	Class	Annual Cost				
			2011	**2012**	**2013**	**2014**	**2015**
25	Lg Lndscp Surveys & Irrig Sys: Rebates	Irrigation	$11,200	$11,200	$11,200	$4,200	$4,200
26	Comm Irrigation System: Rebates	Commercial	$44,805	$44,805	$44,805	$44,805	$44,805
27	Dishwashers: Vendor, Dist & Cont Inc	Commercial	$0	$0	$0	$4,562	$4,562
28	Food Steamers: Cust Rebates	Commercial	$0	$0	$0	$2,411	$2,411
29	Ice Machines: Cust Rebates	Commercial	$0	$0	$0	$10,611	$10,611
30	Pre-Rinse Spray Valves: Cust rebates	Commercial	$0	$0	$0	$445	$445
31	Cooling Tower Cond Cont: Cust Reb, Inc	Industrial	$0	$0	$0	$0	$0
32	Cooling Tower pH Cont: Cust Reb, Inc	Industrial	$0	$0	$0	$0	$0
33	Industrial Process: Audits & Incentives	Industrial	$1,283	$0	$0	$0	$0