
Final Report

2005 Urban Water Management Plan – Cordova



Golden State
Water Company

A Subsidiary of American States Water Company

Region I Headquarters

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Final Report

2005 Urban Water Management Plan – Cordova



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Notice of Adoption

A meeting to solicit public comments on the 2005 Urban Water Management Plan for the Golden State Water Company Cordova System was held on November 28, 2005 at 7:00 PM at the Golden State Water Company at the Golden State Water Company Region I office in Rancho Cordova, California. Notice of this meeting was published in accordance with Section 6066 of Government Code in the Sacramento Bee on November 14 and on November 21, 2005.

Copies of the Urban Water Management Plan were made available to the public at the Arden Cordova Customer Service Area office two weeks prior to the public hearing.

Comments, oral and written, if received and responses to comments are documented in Appendix H of this document.

Golden State Water Company hereby adopts the 2005 Urban Water Management Plan for the Cordova System.



Roland S. Tanner
Vice President, Customer Service
Region I
Golden State Water Company
December 31, 2005

Abbreviations

ABAG	Association of Bay Area Governments
ac-ft	acre-feet
ac-ft/yr	acre-feet per year
Act	Urban Water Management Planning Act
AMCL	alternative MCL
AWWA	American Water Works Association
BMPs	best management practices
CBO	community-based organization
CCL	contaminant candidate list
CCRs	consumer confidence reports
CDHS	California Department of Health Services
cfs	cubic feet per second
CIMIS	California Irrigation Management Information System
Council	California Urban Water Conservation Council
CPE	comprehensive performance evaluation
CPUC	California Public Utilities Commission
CSA	customer service area
CT	concentration time
CUWA	California Urban Water Agencies
CWSs	community water systems
D/DBP	disinfectant/disinfection by-product
DMM	demand management measure
DOC	dissolved organic carbon
DOF	Department of Finance
DWR Guidebook	Guidebook to Assist Water Suppliers in the Preparation of a 2005 Urban Water Management Plan
DWR	Department of Water Resources (California)

EC	enhanced coagulation
EPA	Environmental Protection Agency
ERP	emergency response plan
ETo	evapotranspiration
gpm	U.S. gallons per minute
GSWC	Golden State Water Company
GWR	Groundwater Rule
HAA5	haloacetic acids
IESWTR	Interim Enhanced Surface Water Treatment Rule
IOCs	inorganic contaminants
IRP	Integrated Resource Plan
LACSD	Sanitation Districts of Los Angeles County
LT1ESWTR	Long Term 1 Enhanced Surface Water Treatment Rule
LT2ESWTR	Long Term 2 Enhanced Surface Water Treatment Rule
MCLGs	maximum contaminant level goals
MCLs	maximum contaminant levels
Metropolitan	Metropolitan Water District of Southern California
MG	million gallons
MMM	multimedia mitigation
MOU	memorandum of understanding (regarding urban water conservation in California)
MRDLs	maximum residual disinfectant levels
mrem	millirems
MTBE	methyl tertiary-butyl ether
MWD	Municipal Water District with reference to any of the member agencies of the Metropolitan Water District of Southern California
N/A	not available
NAICS	North American Industry Classification System
NDMA	N-nitrosodimethylamine
NPV	net present value
NTNCWS	non-transient non-community water systems

NTU	nephelometric turbidity units
O&M	operation and maintenance
OEHHA	Office of Environmental Health Hazard Assessment
pCi	picoCuries
RO	reverse osmosis
SCAG	Southern California Association of Governments
SDWA	Safe Drinking Water Act
SMCL	secondary maximum contaminant level
SOCs	synthetic organic contaminants
SUVA	source-water-specific ultraviolet absorbance
SWP	State Water Project
SWTR	Surface Water Treatment Rule
TCR	Total Coliform Rule
TDS	total dissolved solids
TOC	total organic carbon
TTHMs	Total Trihalomethanes Rule
UCM	unregulated contaminants monitoring
ULF	ultra low flush
ULFT	ultra-low-flush-toilet
UWMP	Urban Water Management Plan
VOCs	volatile organic compounds
WEWAC	Water Education Water Awareness Committee
WRCC	Western Regional Climate Center
WRP	water reclamation plant
WSDM Plan	Water Surplus and Drought Management Plan
WY	water year

Definitions

Chapter 2, Part 2.6, Division 6 of the California Water Code provides for definitions for the construction of the Urban Water Management Plans. Appendix A contains the full text of the Urban Water Management Planning Act.

CHAPTER 2. DEFINITIONS

Section 10611. Unless the context otherwise requires, the definitions of this chapter govern the construction of this part.

Section 10611.5. "Demand management" means those water conservation measures, programs, and incentives that prevent the waste of water and promote the reasonable and efficient use and reuse of available supplies.

Section 10612. "Customer" means a purchaser of water from a water supplier who uses the water for municipal purposes, including residential, commercial, governmental, and industrial uses.

Section 10613. "Efficient use" means those management measures that result in the most effective use of water so as to prevent its waste or unreasonable use or unreasonable method of use.

Section 10614. "Person" means any individual, firm, association, organization, partnership, business, trust, corporation, company, public agency, or any agency of such an entity.

Section 10615. "Plan" means an urban water management plan prepared pursuant to this part. A plan shall describe and evaluate sources of supply, reasonable and practical efficient uses, reclamation and demand management activities. The components of the plan may vary according to an individual community or area's characteristics and its capabilities to efficiently use and conserve water. The plan shall address measures for residential, commercial, governmental, and industrial water demand management as set forth in Article 2 (commencing with Section 10630) of Chapter 3. In addition, a strategy and time schedule for implementation shall be included in the plan.

Section 10616. "Public agency" means any board, commission, county, city and county, city, regional agency, district, or other public entity.

Section 10616.5. "Recycled water" means the reclamation and reuse of wastewater for beneficial use.

Section 10617. "Urban water supplier" means a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually. An urban water supplier includes a supplier or contractor for water, regardless of the basis of right, which distributes or sells for ultimate resale to customers. This part applies only to water supplied from public water systems subject to Chapter 4 (commencing with Section 116275) of Part 12 of Division 104 of the Health and Safety Code.

Chapter 1. Introduction and Overview

Background

The Urban Water Management Plan (UWMP) for the Golden State Water Company (GSWC) Cordova System is prepared in compliance with Division 6, Part 2.6, of the California Water Code, Sections 10610 through 10657 as last amended by Senate Bill (SB) 318, the Urban Water Management Planning Act (Act). The original bill, requiring a UWMP, was initially enacted in 1983. SB 318, which became law in 2004, is the eighteenth amendment to the bill. Increased emphasis on drought contingency planning, water demand management, reclamation, and groundwater resources has been provided through the updates to the original bill.

Under the current law, urban water suppliers with more than 3,000 service connections or water use of more than 3,000 acre-feet per year (ac-ft/yr) are required to submit a UWMP every five years to the California Department of Water Resources (DWR). Under the name Southern California Water Company, GSWC prepared a UWMP in 1985, 1990, 1995, and 2000. The 2005 UWMP is an update to the 2000 plan.

The law, as it is now, states and declares the following:

Section 10610.2

(a) *The Legislature finds and declares all of the following:*

- (1) *The waters of the state are a limited and renewable resource subject to ever-increasing demands.*
- (2) *The conservation and efficient use of urban water supplies are of statewide concern; however, the planning for that use and the implementation of those plans can best be accomplished at the local level.*
- (3) *A long-term, reliable supply of water is essential to protect the productivity of California's businesses and economic climate.*
- (4) *As part of its long-range planning activities, every urban water supplier should make every effort to ensure the appropriate level of reliability in its water service sufficient to meet the needs of its various categories of customers during normal, dry, and multiple dry water years.*
- (5) *Public health issues have been raised over a number of contaminants that have been identified in certain local and imported water supplies.*
- (6) *Implementing effective water management strategies, including groundwater storage projects and recycled water projects, may require specific water quality and salinity targets for meeting groundwater basins water quality objectives and promoting beneficial use of recycled water.*
- (7) *Water quality regulations are becoming an increasingly important factor in water agencies' selection of raw water sources, treatment alternatives, and modifications to existing treatment facilities.*

- (8) Changes in drinking water quality standards may also impact the usefulness of water supplies and may ultimately impact supply reliability.*
- (9) The quality of source supplies can have a significant impact on water management strategies and supply reliability.*
- (b) This part is intended to provide assistance to water agencies in carrying out their long-term resource planning responsibilities to ensure adequate water supplies to meet existing and future demands for water.*

Section 10610.4. The Legislature finds and declares that it is the policy of the state as follows:

- (a) The management of urban water demands and efficient use of water shall be actively pursued to protect both the people of the state and their water resources.*
- (b) The management of urban water demands and efficient use of urban water supplies shall be a guiding criterion in public decisions.*
- (c) Urban water suppliers shall be required to develop water management plans to actively pursue the efficient use of available supplies.*

System Overview

GSWC owns and operates the Cordova System. GSWC is an investor-owned public utility company regulated by the California Public Utilities Commission (CPUC).

Located in Sacramento County within the Sacramento metropolitan area, the Cordova System serves a portion of the City of Rancho Cordova and the unincorporated community known as Gold River. Figure 1-1 illustrates the location of the Cordova System.

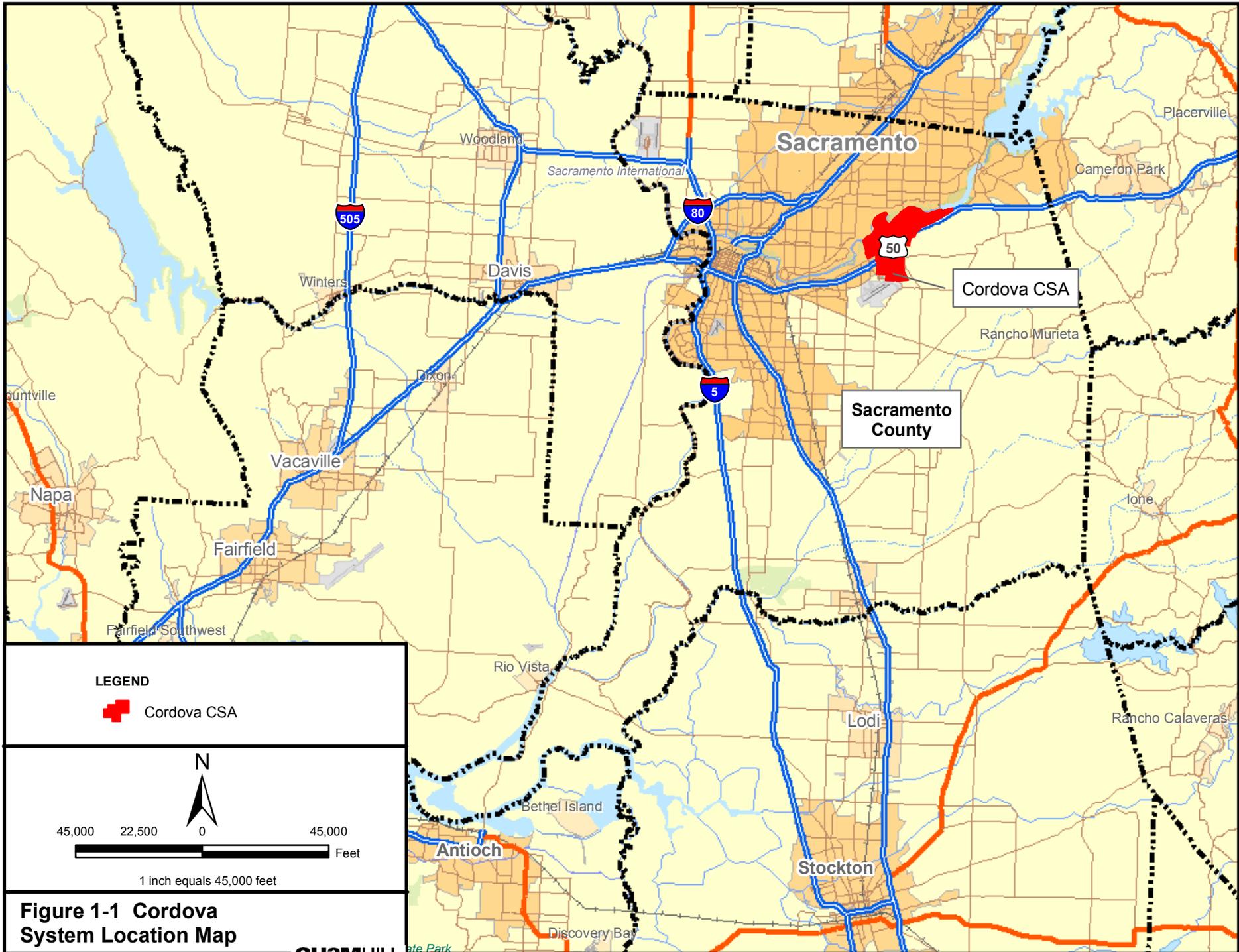


Figure 1-1 Cordova System Location Map

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California Urban Water Conservation Council

GSWC is a signatory to the Memorandum of Understanding Regarding Urban Water Conservation in California (MOU) administered by the California Urban Water Conservation Council (Council). The Council had its beginnings as an independent entity housed under California Urban Water Agencies (CUWA). Currently, the Council is a fully independent nonprofit organization.

The objective of the Council is to implement the MOU. The MOU was signed into existence in 1991 by nearly 100 urban water agencies and environmental groups. Current membership of the Council is over 300 members from various groups such as water suppliers, public advocacy organizations, and other interested groups (Council, 2004).

The MOU is a document by which the signatories obligate themselves to implement the urban water conservation practices identified in the MOU. The goal of the practices in the MOU is to reduce long-term urban water demands and to provide practices that may be implemented during occasional water supply shortages (Council, 2004). The urban water conservation practices identified in the MOU are called the Best Management Practices (BMPs) and range from water audits to toilet replacements. There are 14 practices that also coincide with the 14 demand management measures (DMMs) identified in the Act.

Each agency that is a signatory to the MOU is required to file reports on the implementation of the BMPs identified in the MOU. For the purposes of the UWMP, the reports filed with the Council on the BMPs that are implemented or under implementation can be substituted for the reporting requirements of Section 10631 (f) (1). The UWMP uses the reports filed with the Council in addition to any necessary analysis as described in Section 10631.

Public Utility Commission Policy Changes

Concurrent with the finalization of this document, the CPUC is considering the adoption of policy changes and objectives that would be applicable to GSWC and all other regulated water utilities. The CPUC's draft "Water Action Plan" ("WAP") has established the following objectives:

1. Maintain highest standards of water quality;
2. Strengthen water conservation programs to a level comparable to those of energy utilities;
3. Promote water infrastructure investment;
4. Assist low income ratepayers;
5. Streamline CPUC regulatory decision-making; and
6. Set rates that balance investment, conservation, and affordability.

The WAP is a general policy document. Specific implementation policies and programs, along with necessary modifications to CPUC ratemaking policies, will be developed based

on the final WAP and other programs including conservation, long term planning, water quality and drought management programs developed in conjunction with the CPUC.

GSWC has been actively involved with the CPUC in suggesting optimal approaches to the WAP. In particular, the GSWC has suggested specific implementation measures and modifications to certain CPUC ratesetting practices so that regulated utilities are able as a practical matter to achieve the policy objectives of the WAP. The exact implementation details have not yet been determined, but if successful, are expected to have a significant impact on GSWC approaches to the planning and management of resources. These efforts may include further investment in local resource optimization, reduced reliance on imported supplies, enhanced conservation and intensification of company-wide efforts to optimize water resource mix, including planned water supply projects and programs to meet the long term water supply needs of GSWC's customers.

In another example, the Urban Water Management Planning Act requires public water suppliers to have in place predetermined actions to be undertaken during water shortage conditions. GSWC has developed actions to be undertaken in response to water supply shortages, including up to a 50 percent reduction in water supply. However, implementation of the actions is dependent upon CPUC approval, particularly where mandatory water use restrictions may be required. As an element of the WAP and related policy improvements, GSWC has requested the CPUC adopt water shortage allocation policies that will facilitate appropriate drought response activities and associated cost recovery mechanisms.

Finally, as part of the Water Action Plan process and otherwise, GSWC is seeking parity with public water agencies in key areas that will impact its long term supply planning and reliability, namely, 1) access to state bond money on behalf of its customers, and 2) full participation in integrated regional water planning mechanisms to ensure that utility customers have a voice in planning outcomes, and, equal access to available funding to implement agreed planning objectives on behalf of their customers.

This UWMP presents an assessment of GSWC's demand projections and water supply availability and reliability under currently established CPUC regulations and conditions. While GSWC has detailed approaches to providing its customers with a reliable supply of water in accordance with UWMP criteria, adoption and implementation of the WAP and other policy objectives mentioned above will likely result in changes in the resource mix described in this UWMP which will likely further improve water supply reliability.

Agency Coordination

Water Code Section 10620 details the coordination requirements of the Act and provides guidance on how the UWMP can be prepared. The text of this section states:

Section 10620

- (a) *Every urban water supplier shall prepare and adopt an urban water management plan in the manner set forth in Article 3 (commencing with Section 10640).*
- (b) *Every person that becomes an urban water supplier shall adopt an urban water management plan within one year after it has become an urban water supplier.*

(c) *An urban water supplier indirectly providing water shall not include planning elements in its water management plan as provided in Article 2 (commencing with Section 10630) that would be applicable to urban water suppliers or public agencies directly providing water, or to their customers, without the consent of those suppliers or public agencies.*

(d)

(1) *An urban water supplier may satisfy the requirements of this part by participation in areawide, regional, watershed, or basinwide urban water management planning where those plans will reduce preparation costs and contribute to the achievement of conservation and efficient water use.*

(2) *Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.*

GSWC initiated agency coordination with a mailing of letters to cities and counties within its service area, as well as to wholesale agencies, wastewater agencies, and agencies with which GSWC has emergency connections. The initial letters notified the agencies of GSWC intent and requested data for the preparation of the UWMPs. All identified agencies received a follow-up telephone call. Notices of the public meeting and intent to adopt were submitted to all agencies mentioned below. Table 1-1 lists the agencies contacted during the preparation of this UWMP.

Table 1-1
Coordination with Agencies

Agency	Participated in UWMP Development	Commented on the Draft	Attended Public Meetings	Contacted for Assistance	Sent Notice of Intent to Adopt	Not Involved/ No Information
California American Water Company				✓	✓	
City of Folsom				✓	✓	
City of Rancho Cordova				✓	✓	
County of Sacramento				✓	✓	
Sacramento Area Council of Governments (SACOG)				✓		
Sacramento Regional County Sanitation District				✓		

Notes

1. This table is based on DWR's *Guidebook to Assist Water Suppliers in the Preparation of a 2005 Urban Water Management Plan* (DWR Guidebook) Table 1.

Public Participation and Plan Adoption

Public participation and plan adoption requirements are detailed in the following section of the Act:

Section 10642. Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan. Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection and shall hold a public hearing thereon. Prior to the hearing, notice of the time and place of hearing shall be published within the jurisdiction of the publicly owned water supplier pursuant to Section 6066 of the Government Code. The urban water supplier shall provide notice of the time and place of hearing to any city or county within which the supplier provides water supplies. A privately owned water supplier shall provide an equivalent notice within its service area. After the hearing, the plan shall be adopted as prepared or as modified after the hearing.

For this update of the Cordova System UWMP, a public hearing was held on November 28, 2005 at the GSWC Region I Headquarters in Rancho Cordova, California. This public session was held for review and comment on the draft plan before approval by GSWC. Legal public notices for the public hearing were published in the local newspapers in accordance with Government Code Section 6066. Copies of the draft plan were available to the public at GSWC's Arden-Cordova Customer Service Area (CSA) Office. Appendix B contains a copy of the hearing notice from a local newspaper and the meeting minutes from the public pertaining to the UWMP. Appendix C contains comments received, if any, and Appendix H contains responses to public comments.

The final UWMP, as adopted by GSWC, will be submitted to the DWR within 30 days of adoption. This plan includes all information necessary to meet the requirements of California Water Code Division 6, Part 2.6 (Urban Water Management Planning). Adopted copies of this plan are available to the public at GSWC's Arden-Cordova CSA Office.

UWMP Preparation

GSWC prepared this UWMP with the assistance of its consultant, CH2M HILL, as permitted by the following section of the Act.

Section 10620

(e) The urban water supplier may prepare the plan with its own staff, by contract, or in cooperation with other governmental agencies.

During the preparation of the UWMP, documents that have been prepared over the years by GSWC and other entities were reviewed and results of those documents incorporated, as applicable, into this UWMP. The list of the documents is provided in Chapter 11.

The adopted plans are available for public review at GSWC's Arden-Cordova CSA Office. Copies of the plan were submitted to DWR, cities and counties within the service area, the State Library, and other applicable institutions within 30 days as required by Section 10644 and 10645.

UWMP Implementation

GSWC is committed to the implementation of this UWMP as required by Section 10643 of the Act. Each region of GSWC has a conservation coordinator that oversees the implementation of DMM via GSWC participation in the Council's MOU.

Content of the UWMP

This UWMP addresses all subjects required by Section 10631 of the Act as defined by Section 10630, which permits "levels of water management planning commensurate with the numbers of customers served and the volume of water supplied." All applicable sections of the Act are discussed in this UWMP, with chapters of the UWMP cross-referenced against the corresponding provision of the Act in Table 1-2.

Table 1-2
Summary of UWMP Chapters and Corresponding Provisions of the California Water Code

Chapter	Corresponding Provisions of the Water Code	
Chapter 1. Introduction and Overview	10642	Public participation
	10643	Plan implementation
	10644	Plan filing
	10645	Public review availability
	10620 (a)–(e)	Coordination with other agencies; document preparation
	10621 (a)–(c)	City and county notification; due date; review
	10620 (f)	Resource optimization
	10630	Level of planning
	10641	Coordination
Chapter 2. Service Area	10631 (a)	Demographics and climate
Chapter 3. Water Supply	10631 (b)–(d), (h), (k)	Water sources, reliability of supply, transfers and exchanges, supply projects, data sharing
Chapter 4. Water Use	10631 (e), (k)	Water use, data sharing
Chapter 5. Demand Management Measures	10631 (f)–(g), (j)	DMM
	10631.5	DMM implementation status
Chapter 6. Desalination	10631 (i)	Desalination
Chapter 7. Water Shortage Contingency Plan	10632	Water shortage contingency plan
Chapter 8. Recycled Water Plan	10633	Recycled water
Chapter 9. Water Quality	10634	Water quality impacts on reliability
Chapter 10. Water Service Reliability	10635	Water service reliability

Resource Optimization

Section 10620 (f) asks urban water suppliers to evaluate water management tools and options to maximize water resources and minimize the need for imported water from other regions.

GSWC is committed to optimizing its available water resources and implements water conservation programs for each of its districts or CSAs. In an effort to expand the breadth of offered programs, GSWC partners with wholesale suppliers, energy utilities, and other agencies that support water conservation programs. While GSWC is fully committed to optimizing its available water resources and implementation of BMP's and DMM's, GSWC is currently limited in its ability to do so by certain ratesetting practices. As noted in the introduction, GSWC is working with the CPUC in the shaping of the Water Action Plan so that it assists regulated water utilities in implementing measures that optimize water resource programs.

Chapter 2. Service Area

Service area requirements are detailed in the following section of the Act:

Section 10631

- (a) *Describe the service area of the supplier, including current and projected population, climate, and other demographic factors affecting the supplier's water management planning. The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is available.*

Chapter Two summarizes the Cordova System's service area and presents an analysis of available demographics, population growth projections, and climate data to provide the basis for estimating future water requirements.

Area

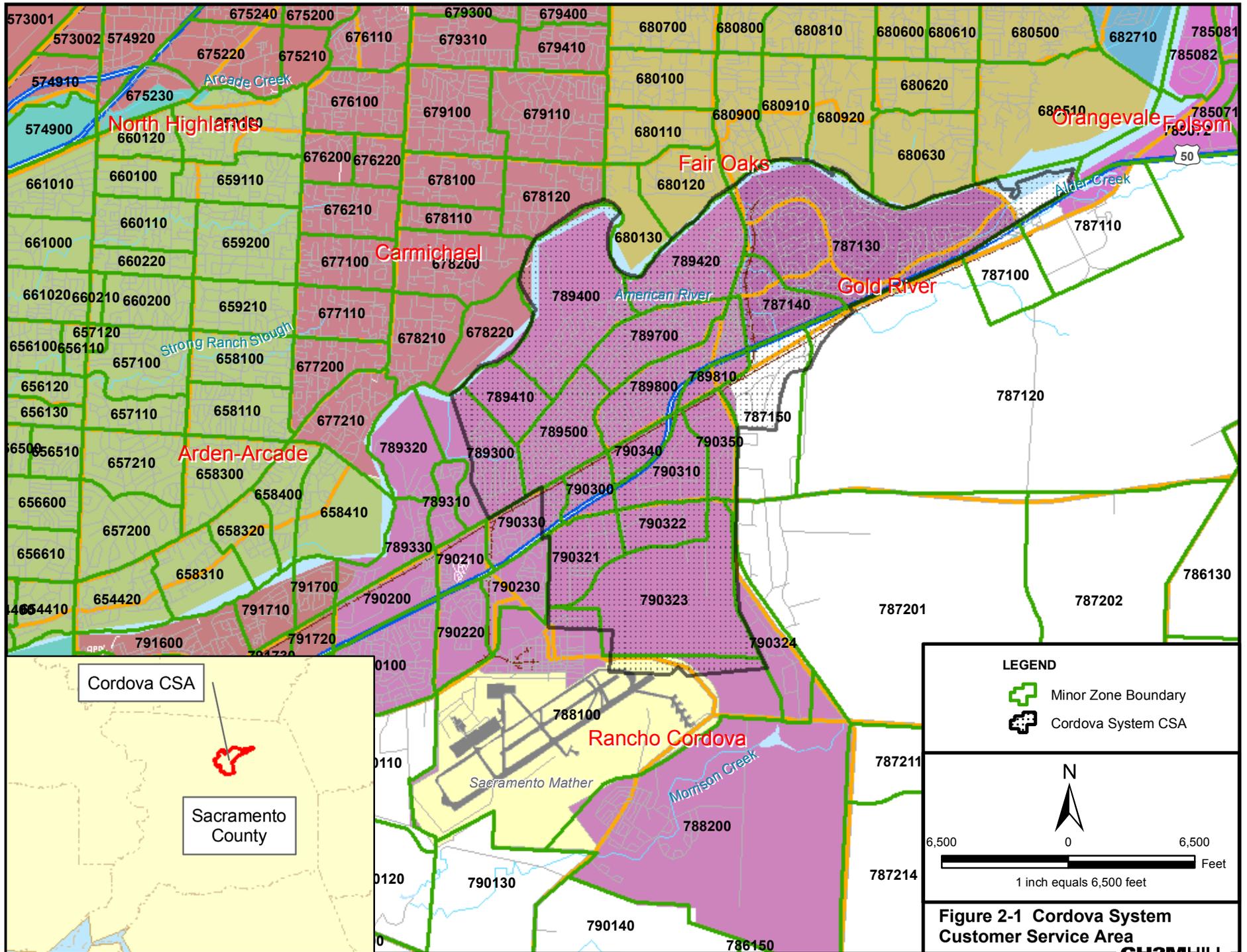
The Cordova System is located in Sacramento County and serves a portion of the city of Rancho Cordova. The service area is bounded by Sunrise Boulevard and Hazel Avenue to the east, Mather Air Force Base to the south, Mather Field Road to the west, and the American River to the north.

Figure 2-1 illustrates the boundaries for the Cordova System. The service area is primarily characterized by residential land use, with some commercial and industrial land use.

Demographics

The City of Rancho Cordova was chosen as demographically representative of the Cordova System. According to 2000 US census data, the median age of Cordova's residents is 32.3 years. Cordova has average household size of 2.66 and a median household income of approximately \$40,095.

The Cordova System map indicates that there is potential land area available for new development. This was verified by information GSWC obtained regarding upcoming development projects within the Cordova service area.



Population, Housing and Employment

Population, housing, and employment projections were developed for the Cordova System using the Sacramento Area Council of Governments (SACOG) population, housing and employment data. SACOG's methodology is described below, followed by the derivation of population projections for the Cordova System. The current projections provided in this report are interim projections provided by SACOG. Final projections are scheduled for release in 2006. The current population projections differ from previous projections developed in 2000 primarily by the use of 2000 U.S. Census data. Previous projections utilized 1990 U.S. Census data.

SACOG Population Projection Development Methodology

The 2000 population, housing, and employment data is derived from the 2000 U.S. Census, which forms a baseline for local data projections.

The forecasts and projections are grouped into many geographical categories, including regional, county, city, unincorporated areas, census tract, and transportation analysis zones or minor zones. Several methodologies including the Demographic Model, Economic Model, Trend Base, Land Use Model and General Plan Model were used in developing the projections at various geographical categories. Demographic models are based on expected characteristics of the population that currently resides in certain locations plus or minus net migration. Regional economic models produce forecasts of employment and industrial output, and population at county and regional level. Trend base projections use historical trends, and future values are extrapolated based on the trends and applied at a sub-area level. The land use model allocates future employment and housing. The general plan approach provides detailed information on types, densities and locations of land uses at the minor zone level. The methodology for these projections incorporates regional growth targets provided by the Center for the Continuing Study of the California Economy (CCSCE). Data from various sources was used to project population, household and employment. These data sources include: the U.S. Census Bureau's 2000 census of population and housing, annual housing and population estimates for years 2000-2004 from the California State Department of Finance (DOF), Demographic Research Unit (DRU) Info USA 2004 employment data, regional growth targets data from the Center for the Continuing Study of the California Economy (CCSCE) and the General Plan from the Sacramento Region Blueprint Project.

The detailed explanation of the population, household and employment projection process employed by SACOG is provided in the document "Projections Update Metropolitan Transportation Plan 2027," (SACOG Projections, 2004)

Year 2005 is the new socio-economic baseline, which represents the most important departure from the previous projection set in methodology and results. The projection methodology employed in previous projections (in 1999) is different from the current recent projections (2000). The major differences include:

- SACOG projected population and household data in 1999 was based on 1990 US census data and SACOG's housing inventory. The 2000 projections are based on 2000 US census data.

- SACOG projected employment data in 2000 is based on data given by CCSCE. The 1999 projections were based on a different resource.
- Persons per household (PPH) are down considerably. The 2000 Census shows a continued decline in household size due to a variety of social and economic factors. The PPH is not geographically homogenous since it includes housing type and other important socio-economic variables.

Cordova System Population Projections

The Cordova System boundaries often contain multiple minor zones, many of which have boundaries that do not coincide exactly with service area boundaries. The population projection analysis consisted of superimposing service area boundaries over minor zone boundaries, identifying the applicable overlapping minor zone, and developing a percentage estimate for each overlapping area. For a minor zone 100 percent within the service area boundaries, it was assumed that 100 percent of the associated minor zone population data was applicable to the Cordova System. For areas where the overlap was not exact, the area of overlap as a percentage was applied to the data to develop an estimate of applicable population. Appendix J, Table J-1 lists the minor zones with a corresponding estimate of what percent of each minor zone lies within the Cordova System.

It was typically assumed that the various types of housing and employment distributed within a minor zone are distributed uniformly within all parts of that minor zone unless maps indicated non-uniform concentrations. In these cases, population estimates were either increased or decreased as applicable to match the existing land use. This report uses SACOG demographic data to determine population and household projections for the years 2000 to 2025. Appendix J, Table J-2 contains all of the SACOG's historic and projected demographic data for each minor zone for those years. The second table on Table J-2 of Appendix J details the minor zones within the Cordova System.

Because the current projections provided by SACOG are interim, we compared both sets of demographic projection data available for the year 2000 and 2005. The 2000 UWMP projections were final projections based on 1990 US census data and therefore deemed more reliable than 2005 interim projections. A discussion on the comparison of projections resulting from the two differing data sets is presented below.

Population Estimates Using Current 2005 SACOG Interim Data

The 2005 SACOG interim population projections estimate a population of 48,618 people in 2005 for the Cordova system. This projection is expected to decrease to 45,443 by 2025 according to 2005 SACOG data. Projection data is not available for 2030. A summary of historic and projected population, households, and employment within the Cordova System (based on SACOG data) is presented in Table 2-1.

Table 2-1.
Cordova System Historical and Projected Population (SACOG 2005 Interim Projections)

Year	Service Area Population	Service Area Household	Service Area Employment
2000 ⁽²⁾	41,472	15,615	50,689

2005	48,618	17,883	36,348
2010	53,183	19,382	44,211
2015	45,998	17,203	48,648
2020	46,370	17,522	54,647
2025	45,443	18,221	60,893
2030	NA ⁽⁴⁾	NA	NA

Notes

1. This table is based on the DWR Guidebook Table 2.
2. Based on fiscal year.
3. Dashed line represents division between historic and projected data
4. NA: Not Available
5. Final projections are scheduled for release in 2006

In summary, from 2000 to 2005 the Cordova System population will increase 17 percent, which is a growth rate¹ of approximately 3.2 percent per year. By 2025, population is expected to decrease by a total of 7 percent, from 48,618 in 2005 to 45,443 in 2025, which is 0.3 percent negative growth rate per year. The number of households is expected to grow 2 percent during the same period, which equates to an annual household growth rate of 0.1 percent. Employment is expected to grow 68 percent during the same period, which equates to an annual employment growth rate of 2.6 percent.

As shown in Table 2-1, SACOG projects a rise in multi-family housing units but a decrease in population. This means that the number of persons per household is decreasing, which would result in higher number of households with a lower population count.

According to SACOG, the data discrepancies in current 2005 projections occur because of the following reasons:

- The projections provided by SACOG for this report are interim projections. The final projections will be available in early 2006
- The anomalous trend of population and household projection is an artifact of the projection methodology that was employed by SACOG in creating these interim projections.

Therefore the 2005 population projections were compared with 2000 projections presented in the 2000 UWMP report.

¹ Growth rate: The number of persons added to (or subtracted from) a population in a year due to natural increase or net migration; expressed as percentage of population at the beginning of the time period. (Source: <http://www.prb.org>)

Populations Estimates Using 2000 SACOG Completed Data

According to 2000 SACOG demographic projections, the Cordova System has an estimated population of 40,732 people in 2005. This population is expected to reach 44,833 by 2025. The year 2020 is assumed by SACOG to be a build-out year for service area households. Therefore, the projections for 2030 are considered similar to 2030 and 2025.

A summary of historic and projected population, households, and employment within the Cordova System (based on SACOG 2000 data) is presented in Table 2-2. The expected date of build-out was accelerated to 2015 when GSWC issued the Water Supply Assessment for the Villages of Zinfandel project in December 2002. This acceleration was based on information GSWC obtained regarding upcoming development projects within the Cordova service area. The data presented in Table 2-2 has been changed to reflect build-out in 2015 by increasing the projected service area household population in 2015 to the 2020 projected value.

Table 2-2.
Service Area Historical and Projected Population (SACOG 2000 Data)

Year	Service Area Population	Service Area Household	Service Area Employment
1990 ⁽²⁾	33,411	13,264	21,306
2000	41,472	15,615	50,689
2005	40,732	16,276	47,896
2010	42,656	16,996	52,336
2015	44,054	17,816 ⁽⁴⁾	55,012
2020	44,889	17,816	56,233
2025	44,833	17,816	56,289
2030	44,833	17,816	56,289

Notes

1. This table is based on the DWR Guidebook Table 2.
2. Based on fiscal year.
3. Dashed line represents division between historic and projected data.
4. Projected households based on SACOG data from 2000 is 17,436 by the year 2015. This number was increased to the 2020 projected figure for this report based on a vacant lot analysis conducted by GSWC. This analysis predicts build-out to occur by the year 2015.

Comparison of 2005 and 2000 SACOG Projections

The interim 2005 and final 2000 projection data provided by SACOG were compared for the period 2000 through 2025. Table 2-3 provides the percentage rate of increase in population, household and employment during the period 2000 through 2025. This comparison showed similar long-term population and household growth rates for the 2000 projections and the 2005 interim projections. Therefore because of the data discrepancies in the 2005 interim projections, the 2000 projections provided in Table 2-2 were used for all future water analysis that is discussed in this 2005 report.

Table 2-3.
Comparison of Percentage Increase in Population, Household and Employment Data during 2000-2025 time period for the Year 2005 and 2000 Projections

Projection Period	Percentage Increase in Population	Percentage Increase in Household	Percentage Increase in Employment
2000 – 2025 (2005 Interim Projections)	10%	17%	20%
2000 – 2025 (2000 Final Projections)	15%	14%	30%

Climate

The Cordova System has cool, humid winters and hot, dry summers. The Western Regional Climate Center (WRCC) has maintained 30 years of historic climate data for the Cordova station. Table 2-4 presents the monthly average climate summary based on historical data for the Cordova system. In winter, the lowest average monthly temperature is approximately 41 degrees Fahrenheit while the highest average monthly temperature reaches approximately 89 degrees Fahrenheit in the summer. Figure 2-2 presents the monthly average precipitation based on 30 year historical data. The rainy season is from November to March. Monthly precipitation during the winter months ranges from 2 to 5 inches. Low humidity occurs in the summer months from May to October. The moderately hot and dry weather during the summer months typically results in moderately high water demand.

Similar to the Western Regional Climate Center in the Cordova area, the California Irrigation Management Information System (CIMIS) web site tracks and maintains records of evapotranspiration (ETo) for select cities. ETo statistics used for this system come from the Sacramento station, which is the closest station (8 miles) to the Cordova System that maintains ETo records. ETo is a standard measurement of environmental parameters that affect the water use of plants. ETo is given in inches per day, month, or year and is an estimate of the evapotranspiration of a large field of well-watered, cool-season grass that is four- to seven-inches tall. The monthly average ETo is presented in inches in Table 2-4. As the table indicates, a greater quantity of water evaporated during June and July in correlation to high temperatures and low humidity, which may result in high water demand.

Table 2-4
Monthly Average Climate Data Summary for Cordova System

Month	Standard Monthly Average ETo ⁽²⁾ (inches)	Average Total Rainfall (inches)	Average Temperature (degrees Fahrenheit)	
			Max	Min
January	1.0	3.66	53.2	37.9
February	1.8	3.1	59.8	41.1
March	3.2	2.36	64.7	43.1
April	4.7	1.12	71.5	45.9
May	6.4	0.49	80.0	50.6
June	7.7	0.15	87.2	55.3
July	8.4	0.03	92.8	58.1
August	7.2	0.07	91.4	57.7
September	5.4	0.28	87.7	55.9
October	3.7	0.9	77.9	50.2
November	1.6	2.13	63.5	42.7
December	0.9	2.94	53.7	38.2

Notes

1. This table is based on the DWR Guidebook Table 3.
2. Evapotranspiration (ETo)

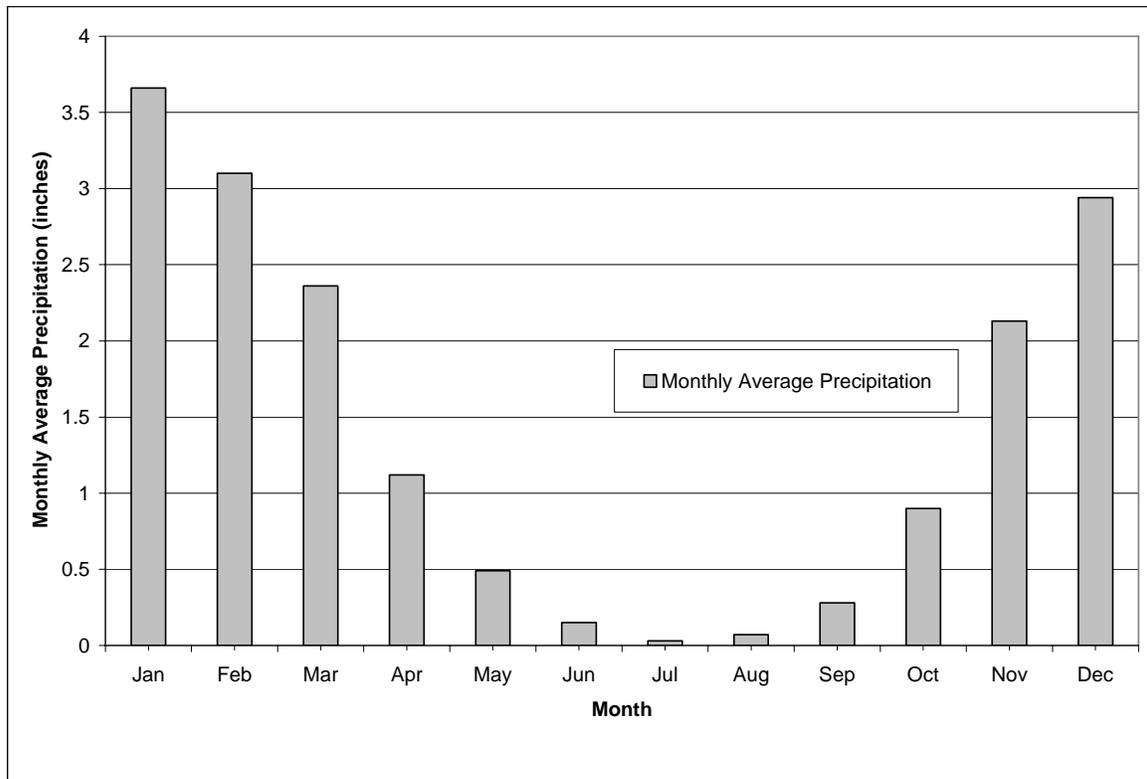


Figure 2-2 Monthly Average Precipitation in the Cordova System based on 30 Years Historical Data

Chapter 3. Water Supply

A detailed evaluation of water supplies is required by the Act. Sections 10631 (a) through (d) and (h) require that:

Section 10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:

- (a) *Describe the service area of the supplier; including current and projected populations, climate, and other demographic factors affecting the supplier's water management planning. The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in 5-year increments to 20 years or as far as data is available.*
- (b) *Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a). If groundwater is identified as an existing or planned source of water available to the supplier, all of the following information shall be included in the plan:*
 - (1) *A copy of any groundwater management plan adopted by the urban water supplier, including plans adopted pursuant to Part 2.75 (commencing with Section 10750), or any other specific authorization for groundwater management.*
 - (2) *A description of any groundwater basin or basins from which the urban water supplier pumps groundwater. For those basins for which a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree.*

For basins that have not been adjudicated, information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition.
 - (3) *A detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.*
 - (4) *A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the urban water supplier. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.*
- (c) *Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable, and provide data for each of the following:*
 - (1) *An average water year.*
 - (2) *A single dry water year.*
 - (3) *Multiple dry water years.*

For any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climatic factors, describe plans to supplement or replace that source with alternative sources or water demand management measures, to the extent practicable.

- (d) *Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.*
- (h) *Include a description of all water supply projects and water supply programs that may be undertaken by the urban water supplier to meet the total projected water use as established pursuant to subdivision (a) of Section 10635. The urban water supplier shall include a detailed description of expected future projects and programs, other than the demand management programs identified pursuant to paragraph (1) of subdivision (f), that the urban water supplier may implement to increase the amount of the water supply available to the urban water supplier in average, single dry, and multiple dry water years. The description shall identify specific projects and include a description of the increase in water supply that is expected to be available from each project. The description shall include an estimate with regard to the implementation timeline for each project or program.*

This chapter addresses the water supply sources of the Cordova System. The following sections provide details in response to the requirements of this portion of the Act.

Water Sources

GSWC obtains its water supply for the Cordova System from surface water from the American River, groundwater from the Central Sacramento Basin, and “Replacement Water” to be supplied by Aerojet and the Sacramento County Water Agency (SCWA). Replacement water will be made available by Aerojet and SCWA to offset groundwater lost due to contamination. In addition, GSWC has entered into a temporary water transfer agreement with the Sacramento Municipal Utility District (SMUD) to allow GSWC to divert up to an additional 7,000 ac-ft/yr from the Folsom South Canal under SMUD’s Central Valley Project (CVP) contract entitlement. SMUD has a water service contract with the Bureau (Contract No. 14-06-200-5198A) for delivery of as much as 60,000 ac-ft/yr of municipal and industrial water from CVP.

American River water is withdrawn from the Folsom South Canal, which extends through the Cordova System service area, and is treated at the Coloma Water Treatment Plant (Coloma WTP) and the Pyrites Water Treatment Plant (Pyrites WTP). Based on the current filtration rate, the Coloma WTP has a maximum reliable daily treatment capacity of approximately 7,140 gallons per minute (gpm). The Pyrites WTP, has a maximum reliable daily treatment capacity of about 3,150 gpm. Cumulatively, the Coloma WTP and the Pyrites WTP provide sufficient capacity for treatment of more than 10,000 gpm (14.4 million gallons per day) of surface water diverted from the Folsom South Canal.

Currently, groundwater is pumped from a total of 15 active wells in the Central Sacramento Basin for the Cordova System. These wells have a current total active capacity of 21,669 ac-ft/yr. Between 2000 and 2004, the actual production averaged 11,630 ac-ft/yr.

Table 3-1 summarizes the current and planned water supplies available to GSWC for the Cordova System that will meet the projected water demands under normal water years. This water supply summary is based on analysis of supplies from surface water, groundwater, and replacement water. Surface water from the American River based on historical water rights, the SMUD water transfer in 2005, and Aerojet Replacement Water via Folsom South Canal (which will be available from 2010) makes up about 50 percent of the supplies, while the remainder is provided by groundwater production and Aerojet Replacement Water through SCWA. There is no projected recycled water supply available for this system (see Chapter 8 for details).

Table 3-1
Current and Planned Water Supplies for the Cordova System in ac-ft/yr

Source	Year					
	2005	2010	2015	2020	2025	2030
Surface water from American River ⁽¹⁾	5,000	5,000	5,000	5,000	5,000	5,000
SMUD Water Transfer ⁽²⁾	5,000	0	0	0	0	0
Aerojet Replacement Water Via Folsom South Canal ⁽³⁾	0	5,000	5,000	5,000	5,000	5,000
GSWC Untreated Groundwater ⁽⁴⁾	8,800	7,450	4,500	4,500	4,500	4,500
Aerojet Replacement Water Through SCWA ⁽⁵⁾	0	3,483	7,568	7,823	7,834	7,834
Recycled water	0	0	0	0	0	0
Total	18,800	20,933	22,068	22,323	22,334	22,334

Notes

1. GSWC American River Rights
2. Under this water transfer from SMUD, GSWC is entitled to divert up to 10,000 ac-ft/yr from the American River through July 29, 2007, and for additional years upon request. However, GSWC plans to utilize only 5,000 ac-ft/yr of this entitlement due to limited surface water treatment capacity and its desire to maintain its groundwater rights through the Aerojet Replacement Water operations described in the Reliability Section.
3. Aerojet Replacement Water obligation
4. Based on GSWC's maximum annual extractions prior to 2005 and projected changes to groundwater supply through 2030
5. SCWA will recapture, treat and deliver groundwater to GSWC up to an additional 10,200 ac-ft/yr of groundwater discharged by Aerojet into the American River.
6. Table format based on DWR Guidance Document Table 4

GSWC's water supply is projected to increase by about 19 percent from 2005 to 2030 to meet the associated projected water demands, with this total demand being met by surface water and groundwater from the Central Sacramento Basin. Details of the water rights and the availability and reliability of these water supplies are presented below. Water demand projections are documented in Chapter 4.

Surface Water

GSWC possesses a pre-1914 appropriative right to divert up to 10,000 ac-ft/yr from the American River via the Folsom South Canal at a maximum withdrawal rate of 20 cubic feet per second (cfs) or 13 mgd. Appropriative surface water rights initiated prior to 1914 are not subject to the Water Commission Act and successor laws relating to water right permitting requirements, and therefore do not require a permit from the State Water Resources Control Board. The point of diversion for this right has been changed since its initiation, so that the water is now diverted from the American River through the Folsom South Canal, which is operated by the United States Bureau of Reclamation. The Folsom South Canal is part of the Folsom Unit of CVP. In 1994 GSWC entered into an “Agreement for Reallocation of Water under Co-Tenancy Agreement” with the City of Folsom to lease 5,000 ac-ft/yr of water rights to the City of Folsom. The company retained 5,000 ac-ft/yr of its right, which is diverted from the Folsom South Canal for use within the Cordova System. During the last 20 years, GSWC has used as much as 4,784 ac-ft/yr of this entitlement.

In addition to the 5,000 ac-ft/yr obtained from GSWC’s pre-1914 water right to the American River, GSWC’s temporary water transfer agreement with SMUD allows GSWC to divert up to an additional 10,000 ac-ft/yr from the Folsom South Canal under SMUD’s CVP contract entitlement. The SMUD agreement became effective on April 29, 2002 and expires on July 29, 2007, unless renewed pursuant to a request by GSWC. As explained in the Reliability of Replacement Water section below, after the expiration of the SMUD water transfer, GSWC will be entitled to continue diversions of 5,000 ac-ft/yr from the Folsom South Canal pursuant to the terms of a settlement agreement reached with Aerojet.

The Cordova System’s distribution facilities also have been designed with several interconnections to neighboring water purveyors for emergency purposes. GSWC maintains three 6-inch interconnections with the California-American Water Company’s distribution system in the west side of the Cordova System, and a 12-inch interconnection with the City of Folsom at the eastern edge of the Cordova System. In addition, the Cordova System has five reservoirs with a total capacity of 9.5 million gallons; one additional reservoir with an additional 5.0 million gallons is scheduled to be online in spring 2006.

Groundwater

The Cordova System is supplied by groundwater from 15 production wells located in the Central Sacramento Basin (also known as the South American Subbasin). The Central Sacramento Basin is a subbasin of the Sacramento Valley Groundwater Basin.

Central Sacramento Basin

The Central Sacramento Basin (Basin) has a surface area of approximately 248,000 acres (388 square miles) and is drained by the American, Cosumnes, and Sacramento Rivers and their tributaries. The Central Sacramento Basin is bounded by the Sierra Nevada on the east, the Sacramento River on the west, the American River on the north, and the Cosumnes and Mokelumne Rivers on the south. These perennial rivers create a groundwater divide in the

shallow subsurface. At greater depths, groundwater interaction with the adjacent subbasins occurs (DWR, 2003).

The water-bearing units in the Central Sacramento Basin consist of Late Tertiary to Quaternary age continental deposits that include:

- Younger alluvium consisting of flood basin deposits, dredge tailings, and Holocene stream channel deposits. The flood basin deposits consist primarily of silts and clays (resulting in low permeability and well yields), and occur along the western margin of the basin adjacent to the Sacramento River. The dredge tailings consist of gravel, cobbles, boulders, sand, and silt along the American River in the northeast corner of the basin, resulting from gold dredging operations. The stream channel deposits consist primarily of unconsolidated silt, fine- to medium-grained sand, and gravel deposited in the active channels along the Sacramento, American, and Consumnes Rivers and the major tributaries. Sand and gravel zones are highly permeable and yield significant quantities of water to wells.
- Older alluvium consisting of loosely to moderately compacted sand, silt, and gravel deposited in alluvial fans during the Pliocene and Pleistocene. The older alluvium ranges in thickness from 100 to 650 feet, is moderately permeable, and has a calculated specific yield of approximately 7 percent.
- Miocene/Pliocene volcanics consisting of the Mehrten Formation, a sequence of fragmental volcanic rocks, composed of intervals of “black sands”, stream gravels, silt, and clay interbedded with intervals of dense tuff breccia. The thickness ranges between 200 and 1,200 feet, with the sand and gravel intervals having high permeability and high well yields. The tuff breccia intervals act as confining layers.

The total groundwater storage capacity of the Central Sacramento Basin is approximately 4,816,000 ac-ft (DWR, 2005). The basin is estimated to have approximately 260,000 ac-ft of recharge per year and a subsurface outflow of 30,000 ac-ft (DWR, 2003).

Historically, groundwater levels have fluctuated in the Central Sacramento Basin. From 1960 to 1980 groundwater levels declined by approximately 20 ft from 1960 levels, and then recovered by 10 ft from 1980 to 1983. Groundwater levels were steady until the period from 1987 to 1995 when water levels declined by approximately 15 ft. Since 1995, water levels have increased up to 20 ft to just below pre-1960 levels. (DWR, 2003).

There are several municipal and industrial water purveyors that extract groundwater from the Central Sacramento Basin besides GSWC, including: California-American Water Company, City of Folsom, City of Sacramento, Elk Grove Water Works, Florin County Water District, Fruitridge Vista Water Company, Omochumne-Hartnell Water District, Rancho Murieta Community Services District, Sacramento County Water Agency, Tokay Park Water Company. In addition, there are numerous private parties, including ranchers and farmers that use groundwater from the Central Sacramento Basin. These users are concentrated in the southern portion of the Basin.

Several groundwater studies have been conducted in the Central Sacramento Basin. None of these studies, performed by DWR or any other entity, indicate that the Basin has been or is in a general state of overdraft. Local depressions have occurred in some areas. However, no

GSWC wells are present at these locations. DWR has not projected that the Basin will become overdrafted if present management conditions continue. Therefore, GSWC's appropriative groundwater rights may be safely and reliably exercised in the future, and surplus groundwater within the Central Sacramento Basin might also make increased extraction by GSWC or others possible.

Basin Adjudication

The Central Sacramento Basin is not adjudicated, but there is a voluntary groundwater management effort being undertaken by a large group of stakeholders south of the American River called the Central Sacramento County Groundwater Forum (CSCGF). The CSCGF was formed in 2002 to provide a reliable and safe water supply to the inhabitants of the Basin up to 2030 and to preserve the wildlife, recreation, and aesthetics of the lower American River. The quantity of appropriative groundwater rights is determined by the maximum quantity of historical extractions. GSWC has established groundwater rights based on the highest historical year of pumping, in 2001, at a rate of approximately 13,257 ac-ft/yr.

Table 3-2 lists the wells and well capacities for GSWC's Cordova System. The Cordova System has a total active normal year capacity of 21,669 gpm (31,500 ac-ft/yr).

Table 3-2
Wells and Well Capacity in the Cordova System

Well Name	Design Well Capacity (gpm)	Design Well Capacity (ac-ft/yr)	Actual Well Capacity (gpm)	Actual Well Capacity (ac-ft/yr)	Status
Agnes Circle No. 8	500	806	615	895	Active
Alicante No. 1	400	645	0	0	Inactive
Capital No. 23	1,600	2,580	1,950	2,835	Active
Coloma Road No. 20	2,600	4,193	2,500	3,630	Active
Cristobal No. 11	700	1,129	0	0	Inactive
Dolecetto No. 6	700	1,129	840	1,225	Active
El Segundo No. 4	350	564	385	560	Active
Georgetown No. 7	650	1,048	764	1,110	Active
Gilbert No. 3	700	1,129	845	1,230	Active
Gold Country No. 21	1,000	1,290	930	1,350	Active
Marcel No. 5	700	1,129	615	900	Active
Mather No. 18	1,700	2,742	1,920	2,790	Active
Negara No. 10	700	1,129	820	1,200	Active
Park No. 17	1,500	2,419	1,540	2,250	Active
South Bridge Street No. 22-A	3,000	4,838	3,550	2,700	Active
South Bridge Street	2,800	4,838	3,670	5,325	Active

Table 3-2
Wells and Well Capacity in the Cordova System

Well Name	Design Well Capacity (gpm)	Design Well Capacity (ac-ft/yr)	Actual Well Capacity (gpm)	Actual Well Capacity (ac-ft/yr)	Status
No. 22-B					
Whistler No. 14	850	1,371	0	0	Inactive
Wood Cliff No. 12	675	1,089	725	1,050	Active
Total Capacity	21,125	34,054	21,669	29,050	
Active Capacity	19,175	30,910	21,669	29,050	

In some areas of the basin, groundwater has been impacted by contamination of volatile organic compounds (VOCs), perchlorate, and N-nitrosodimethylamine (NDMA) from Aerojet's rocket propellant manufacturing and testing facility located immediately to the east of the Cordova System. The effects of changes in water quality on the water supply are discussed in further detail in the Reliability section in this chapter and in Chapter 9.

The pumping history for the Cordova System is shown in Table 3-3 for calendar years (January 1 – December 31) 2000 to 2004.

Table 3-3
Groundwater Pumping History by Cordova System (2000 to 2004) in ac-ft

Basin Name	Year				
	2000	2001	2002	2003	2004
Central Sacramento	11,484	13,257	11,225	10,165	12,249
Percent of Total Water Supply	71	76	64	58	65

Notes

1. Table format based on DWR Guidance Document Table 6
2. Years are reported in calendar years (January 1 – December 31)

Table 3-4 shows the projected groundwater pumping amounts by the Cordova System. As a result of changes in water quality, the groundwater supply for the Cordova System is expected to decrease between 2005 and 2015. The changes in groundwater supply are discussed in detail in the Reliability of Supply section below.

Table 3-4
Projected Groundwater Pumping Amounts by Cordova System to 2030 in ac-ft

Basin Name	Year					
	2005	2010	2015	2020	2025	2030
Central Sacramento	8,800	7,450	4,500	4,500	4,500	4,500
Percent of Total Water Supply	47	36	20	20	20	20

Notes

1. Table format based on DWR Guidance Document Table 7
2. Years are reported in calendar years (January 1 – December 31)

Reliability of Supply

The Cordova System obtains its water supply from three sources: surface water, local groundwater, and replacement water under the Master Settlement Agreement and Release (Settlement Agreement) with Aerojet (discussed below). Therefore, conditions in local areas can impact the reliability of supplies. In general, GSWC's supply is expected to be 100 percent reliable through 2030. This reliability is a result of: 1) a highly reliable surface water supply from the American River, 2) the Settlement Agreement, and 3) historically reliable groundwater supply from the Central Sacramento Basin. Following is a summary of the basis of this reliability.

Reliability of Surface Water

As mentioned earlier, the Cordova System has pre-1914 appropriative right of up to 10,000 ac-ft/yr from the American River, including 5,000 ac-ft/yr that are currently leased by the City of Folsom. Appropriative surface water rights initiated prior to 1914 are not subject to the Water Commission Act and successor laws relating to the water right permitting requirements, and thus do not require a permit from the State Water Resources Control Board. Because appropriative rights are granted priority based upon the year of initiation, the early priority date of GSWC's American River right (1851) provides this right a high priority, which in turn makes the right highly reliable even during drought periods.

Reliability of Groundwater

Since 1995 GSWC has reliably extracted an average of 11,753 ac-ft/yr of groundwater from the Central Sacramento Basin. GSWC's highest historical production occurred in 2001, when GSWC pumped 13,257 ac-ft/yr.

As mentioned above, portions of the Basin from which the Cordova System produces groundwater are severely impacted by groundwater contamination. This contamination is primarily the result of waste disposal methods previously used by Aerojet at its rocket propellant manufacturing and testing facility located immediately to the east of the Cordova System. The contaminants consist primarily of volatile organic compounds (VOCs), perchlorate and N-nitrosodimethylamine (NDMA). VOCs were discovered in the local groundwater supply in the early 1980s. Aerojet mitigated the impacts of the VOC contamination by installing granular activated carbon filtration systems at the wellhead of several affected GSWC wells. The presence of perchlorate in the groundwater was first

reported to GSWC in January of 1997, and the presence of NDMA was reported to GSWC shortly thereafter. This contamination has caused GSWC to suspend the operation of several wells, as described above.

As a result of the contamination, GSWC filed litigation against both Aerojet and the State of California. GSWC settled its action against the State in January 2003 and settled with Aerojet in October 2004. Under the Settlement Agreement, Aerojet guarantees that replacement water supplies (Replacement Water) will be made available to offset lost groundwater production in the Cordova System, up to a maximum of 15,200 ac-ft/yr. Accordingly, when combined with GSWC's 5,000 ac-ft/yr of Folsom Canal surface water rights, the Cordova System is ensured of a perpetual reliable water supply of at least 20,200 ac-ft/yr.

It is anticipated that in the future, more of GSWC's wells may become affected by contamination. As a result, as GSWC wells are removed from the water supply system, the replacement water, as discussed below, will be used to offset any losses in groundwater pumping capacity. Groundwater production from remaining wells is expected to produce up to 4,500 ac-ft/yr through at least 2030.

Reliability of Replacement Water

As previously stated, Aerojet guarantees that replacement water supplies will be made available to offset lost groundwater production in the Cordova System, up to a maximum of 15,200 ac-ft/yr. The Settlement Agreement requires that replacement water be supplied from two sources: Aerojet and the Sacramento County Water Agency (SCWA).

Aerojet supplies replacement water from its extraction and treatment of contaminated groundwater at several groundwater extraction and treatment facilities. The facilities extract and treat the contaminated groundwater and then discharge the treated water into several tributaries of the American River. GSWC will divert up to 5,000 ac-ft/yr of the treated water via the Folsom South Canal.

In addition, the Settlement Agreement entitles GSWC to receive the remaining 10,200 ac-ft/yr of replacement water from SCWA facilities, if additional GSWC wells are impacted from the groundwater contamination. The replacement water will be provided from a planned diversion and treatment facility located downstream on the Sacramento River, called the Freeport Project. Surface water would be treated by SCWA and delivered to GSWC's Cordova System. The Freeport Project is estimated to be completed within five to seven years and will replace the lost production capacity of GSWC's wells as they become impacted by the migration of the contamination plume(s).

Overall Assessment of Cordova System Water Supply Reliability

Supply reliability for the Cordova System depends upon the reliability of the surface water rights, groundwater production, and replacement water supplied from the Settlement Agreement. The combination of replacement water measures to be undertaken by Aerojet and SCWA pursuant to the Settlement Agreements will ensure that GSWC has the supplies necessary to meet its water supply demands through 2030. Two production wells are expected to remain operational until at least 2032, which allows for the production of up to 4,500 ac-ft/yr of groundwater (Table 3-4). Combined with 5,000 ac-ft/yr of surface water rights from the American River and up to 15,200 ac-ft/yr of replacement water from Aerojet,

a sufficient water supply of 24,700 ac-ft/yr exists to meet all of the water demands in the Cordova System. It should be noted that the supplies available exceed the supplies needed to meet the projected demands (Table 3-1). Buffer (excess available supply) serves to increase reliability of supplies.

Table 3-5
Supply Reliability for the Cordova System in ac-ft/yr

Water Supply Source	2005	2010	2015	2020	2025	2030
GSWC American River Rights ⁽¹⁾	5,000	5,000	5,000	5,000	5,000	5,000
SMUD Water Transfer ⁽²⁾	5,000	0	0	0	0	0
Aerojet Replacement Water Via Folsom South Canal ⁽³⁾	0	5,000	5,000	5,000	5,000	5,000
GSWC Untreated Groundwater ⁽⁴⁾	13,250	7,450	4,500	4,500	4,500	4,500
Aerojet Replacement Water Through SCWA ⁽⁵⁾	0	10,200	10,200	10,200	10,200	10,200
Contingency Plan Additional Supplies ⁽⁶⁾	0	0	0	0	0	0
Total Supplies	23,250	27,650	24,700	24,700	24,700	24,700

Notes

1. GCWC American River Rights refers to that portion of the GSWC pre-1914 appropriative rights in the American River that have been previously dedicated to public use in the Rancho Cordova service area and not re-allocated by GSWC to the City of Folsom.
2. Under this water transfer from SMUD, GSWC is entitled to divert up to 10,000 ac-ft/yr from the American River through July 29, 2007, and for additional years upon request. However, GSWC plans to utilize only 5,000 ac-ft/yr of this entitlement due to limited surface water treatment capacity and its desire to maintain its groundwater rights through the Aerojet Replacement Water operations described in (3) below.
3. Under its Replacement Water obligation, Aerojet will deliver the first 5,000 ac-ft/yr of groundwater treated and discharged into the American River to GSWC at GSWC's existing diversion point on the Folsom South Canal through an exchange. Aerojet, GSWC and SCWA have agreed that this water will be deemed a recapture of groundwater under GSWC's existing groundwater rights. GSWC's ability to recapture this water supply is not dependent upon the construction by SCWA of a treatment plant that will deliver potable water in other locations. As soon as this supply is available, GSWC will reduce its reliance upon the SMUD water transfer. Aerojet is required to supply 5,000 ac-ft/yr of Replacement Water without regard to other supplies available to GSWC and without regard to whether GSWC loses additional wells to contamination.
4. GSWC's maximum annual extractions prior to 2005 were equal to approximately 13,250 ac-ft/yr. Under GSWC's appropriative rights to groundwater, GSWC would be able to and would continue to increase its groundwater production commensurate with water supply demands, were it not for the Aerojet groundwater contamination. For years from 2015-2025, it is assumed that all of GSWC's existing groundwater wells other than Wells 17 and 23 will be inactivated, even though this may not occur. As GSWC's other wells close, its rights to additional Replacement Water will increase to cover any losses that occur, up to a maximum of 10,200 ac-ft/yr.
5. In addition to the 5,000 ac-ft/yr of Replacement Water described in (3) above and diverted by GSWC from the Folsom South Canal, SCWA will recapture, treat and deliver to GSWC up to an additional 10,200 ac-ft/yr of groundwater discharged by Aerojet into the American River. The amount of water that GSWC receives will depend on GSWC's loss of additional wells to contamination. If GSWC does not lose additional wells, this water supply will remain in reserve. Delivery of this potable water supply is contingent upon SCWA's construction of diversion, treatment and delivery facilities, which are estimated to be completed by 2010 - 2012.
6. The Contingency Plan obligates Aerojet to cure any shortage that follows from delays in securing Replacement Water via the Folsom South Canal ((3) above) or through deliveries by SCWA ((5) above). Aerojet may elect to cure any shortages through additional groundwater extractions, treatment technologies or future water transfers or purchases.

In addition, conservation measures that are being implemented within the Cordova System are expected to reduce demands. Importantly, GSWC's reliable water supplies will be able to meet the demands of the Cordova System even without any of the expected reduction in demands due to water conservation.

Moreover, the System's distribution facilities also have been designed with several interconnections to neighboring water purveyors for emergency purposes. Additional water supplies also could be obtained by GSWC through a transfer or purchase agreement with another water supply provider. GSWC may be able to purchase additional water supplies from SCWA through the Freeport Project on the Sacramento River.

Table 3-6 presents water supply projections for surface water, replacement water, and groundwater sources during a normal year, single-dry year, and multiple-dry years for the Cordova System. The normal-year supply represents the expected supply under average hydrologic conditions, the dry-year supply represents the expected supply under the single driest hydrologic year, and the multiple-dry year supply represents the expected supply during a period of three consecutive dry years.

Table 3-6
Supply Reliability for Cordova System for Year 2030 in ac-ft/yr

Source	Normal Water Year	Single-Dry Water Year	Multiple-Dry Water Years		
			Year 1	Year 2	Year 3
Surface water	5,000	5,000	5,000	5,000	5,000
Aerojet Replacement Water via Folsom South Canal	5,000	5,000	5,000	5,000	5,000
GSWC Untreated Groundwater	4,500	4,500	4,500	4,500	4,500
Aerojet Replacement Water through SCWA	7,834	7,834	7,834	7,834	7,834
Recycled water	0	0	0	0	0
Total	22,334	22,334	22,334	22,334	22,334
Percent of Normal		100	100	100	100

Notes

1. Groundwater extractions based on projections of two GSWC wells still active in 2030. If groundwater is not available, Aerojet Replacement Water through SCWA would be increased to meet demands.
2. Aerojet Replacement Water through SCWA is reliable to a minimum of 10,200 ac-ft/yr. This could be increased if groundwater is not reliable until 2030.
3. Table format based on DWR Guidance Document Table 8

Since GSWC began operating the Cordova System in 1964, it has satisfied the system's water demands, in both wet and dry cycles, including the droughts of 1976-1977 and 1987-1992. Because groundwater availability is not immediately susceptible to drought conditions and because GSWC's pre-1914 American River surface water rights are of a high priority, the Cordova System's water supply has historically remained consistent and has experienced no change in supply during drought conditions.

With the Settlement Agreement in place, GSWC will be able to reliably maintain a consistent water supply to satisfy current and anticipated future demands within the Cordova System despite the potential that migration of existing contamination may impact more of GSWC's wells. As explained above, the provision of Replacement Water, as set forth in the Settlement Agreement and the side agreement with SCWA, ensures a Replacement Water supply of up to 15,200 ac-ft/yr, which, when combined with GSWC's 5,000 ac-ft/yr of pre-1914 American River water rights and continued groundwater production of 4,500 ac-ft/yr, will ensure a consistent supply of up to 24,700 ac-ft/yr of water under buildout conditions.

As described above, surface water supplies from the American River and groundwater supplies are expected to be 100 percent reliable to meet demands through 2030. Therefore, the water supply projections for a normal, single-dry year, and multiple-dry years are taken as the 2030 projection, which is equivalent to the water demand projected for 2030. It is assumed that the single-dry year and multiple-dry year supplies are the same as those for the normal years because the available supplies are in excess (see Table 1-5) of the supplies projected to meet the demands.

In addition to the sufficient and reliable supplies discussed above, there are additional possible supplies available to the Cordova System if there were unexpected restrictions on GSWC's other water supplies. The measures for augmentation of current supplies include further treatment of groundwater, entering into water transfer or purchase agreements or use of GSWC's Water Shortage Contingency Plan.

The reliability of groundwater is dependent on local hydrologic conditions and availability of other water for augmented recharge. For the groundwater reliability analysis, precipitation data from 1956 through 2004 were reviewed. Data for the water year basis for Table 3-7 was reported by the Western Regional Climate Center (WRCC) (WRCC, 2005). The WRCC reported precipitation at the Folsom Dam from Water Year (WY) 1956 through WY 2004 (WY October 1 through September 30). WY 1994 (October 1, 1993 - September 30, 1994) was the single driest year with 9.27 inches of precipitation. The normal water year was based on DWR's description of the median water year over the period of record. The median annual precipitation between WY 1956 and WY 2004 at Folsom Dam was 19.91 inches. Based on the median precipitation, the normal water year was 1991. The multiple dry year period of WY 2002 through WY 2004 recorded the lowest 3-year total of precipitation. Historically, GSWC has produced an annual maximum of 13,257 ac-ft/yr of groundwater from the Central Sacramento Basin. Between 2005 and 2030, groundwater extractions for the Cordova System are projected to decrease from 13,250 ac-ft/yr to approximately 4,500 ac-ft/yr.

Table 3-7
Basis of Water Year Data

Water Year Type	Base Year(s)	History Sequence
Normal Water Year	1991	1956 – 2004
Single-Dry Water Year	1994	1956 – 2004
Multiple-Dry Water Years	2002 – 2004	1956 – 2004

Notes

1. Data used was from the Western Regional Climate Center record of precipitation at the Folsom Dam on water year basis
2. Normal Water Year calculated from median precipitation from WY 1956 -WY 2004
3. Table format based on DWR Guidance Document Table 9

Factors Resulting in Inconsistency of Supply

Table 3-8 presents factors that could potentially result in inconsistency of supply for the Cordova System. The System's surface water supply is limited to its current 5,000 ac-ft of unallocated water rights for American River water. Due to the pre-1914 seniority of the water right, no constraints to use are anticipated.

As discussed above, GSWC anticipates the groundwater supply for the Cordova System will be reduced as a result of groundwater contamination. Under the Settlement Agreement, Aerojet will supply replacement water to augment the water supply and cover any losses in the groundwater supply.

Table 3-8
Factors Resulting in Inconsistency of Supply

Name of Supply	Legal	Environmental	Water Quality	Climatic
Surface water from the American River	N/A	N/A	N/A	N/A
Groundwater, Central Sacramento Groundwater Basin	N/A	N/A	See Chapter 9 for details. GSWC expects groundwater extractions to be reduced between 2005 and 2015 due to contamination. Water supply will be augmented with replacement water from the Settlement Agreement.	N/A

Notes

1. Table format based on DWR Guidance Document Table 10
2. N/A = Not applicable or not available

Transfers and Exchanges

GSWC has entered into a temporary water transfer agreement with SMUD to allow GSWC to divert up to an additional 10,000 ac-ft/yr from the Folsom South Canal under SMUD's CVP contract entitlement. The contract term is five years, from July 29, 2002 through July 29, 2007. GSWC can request this entitlement for additional years. However, GSWC plans to utilize only 5,000 ac-ft/yr of this entitlement due to limited surface water treatment capacity

and its desire to maintain its groundwater rights through the Aerojet Replacement Water operations discussed above.

In addition, GSWC may be able to purchase additional water supplies from SCWA through the Freeport Project on the Sacramento River, since SCWA will be delivering water to GSWC on a wholesale basis already under the Settlement Agreement with Aerojet

Table 3-9 presents planned transfer and/or exchange opportunities in the Cordova System.

Table 3-9
Transfer and Exchange Opportunities

Source Transfer Agency	Transfer or Exchange	Short Term	Proposed Quantities	Long term	Proposed Quantities
Sacramento Municipal Utilities District	Transfer	5 years (2002–2007)	Up to 10,000 ac-ft/yr	N/A	N/A

Notes

1. Table format based on DWR Guidance Document Table 11
2. N/A – Not applicable

Planned Water Supply Projects and Programs

There are no specifically identified water supply projects and programs in the Cordova System at this time; therefore, Table 3-10 has been left blank. GSWC, as a part of its normal maintenance and operations, will construct replacement wells, pipelines, and treatment systems as needed as a part of its ongoing Capital Improvement Program to maintain its supply and meet distribution system requirements.

Table 3-10
Future Water Supply Projects in ac-ft

Project Name	Normal Year	Single Dry Year	Multiple Dry Years		
			Year 1	Year 2	Year 3
N/A	N/A	N/A	N/A	N/A	N/A

Notes

1. This table is based on the DWR Guidebook Table 17.
2. N/A – Not applicable

Wholesale Agency Supply Data

There are no wholesale water supplies planned in the Cordova System at this time; therefore, Table 3-11, Table 3-12 and Table 3-13 have been intentionally left blank

Table 3-11
Existing and Planned Water Sources Available to the Cordova System

Wholesaler Sources	2010		2015		2020		2025		2030	
	Existing	Planned								
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Notes

1. N/A – Not applicable
2. Table format based on DWR Guidance Document Table 20

Table 3-12
Reliability of Wholesale Supply for Year 2030 in ac-ft/yr

Wholesaler	Single Dry	Multiple-Dry Water Years		
		Year 1	Year 2	Year 3
N/A	N/A	N/A	N/A	N/A
Percent of Normal	N/A	N/A	N/A	N/A

Notes

1. N/A – Not applicable
2. Table format based on DWR Guidance Document Table 21

Table 3-13
Factors Affecting Wholesale Supply

Name of Supply	Legal	Environmental	Water Quality	Climatic
N/A	N/A	N/A	N/A	N/A

Notes

1. N/A – Not applicable
2. Table format based on DWR Guidance Document Table 22

Chapter 4. Water Use

Section 10631 (e) of the Act requires that an evaluation of water use be performed for the Cordova System. The Act states the following:

Section 10631

(e)

- (1) *Quantify, to the extent records are available, past and current water use, over the same five-year increments described in subdivision (a), and projected water use, identifying the uses among water- use sectors including, but not necessarily limited to, all of the following uses:*
 - (A) *Single-family residential*
 - (B) *Multifamily*
 - (C) *Commercial*
 - (D) *Industrial*
 - (E) *Institutional and governmental*
 - (F) *Landscape*
 - (G) *Sales to other agencies*
 - (H) *Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof*
 - (I) *Agricultural.*
- (2) *The water-use projections shall be in the same five-year increments described in subdivision (a).*

In addition, Section 10631 (k) directs urban water suppliers to provide existing and projected water-use information to wholesale agencies from which water deliveries are obtained. The Act states the following:

Section 10631

- (k) *Urban water suppliers that rely upon a wholesale agency for a source of water, shall provide the wholesale agency with water-use projections from that agency for that source of water in five-year increments to 20 years or as far as data is available. The wholesale agency shall provide information to the urban water supplier for inclusion in the urban water supplier's plan that identifies and quantifies, to the extent practicable, the existing and planned sources of water as required by subdivision (b), available from the wholesale agency to the urban water supplier over the same five-year increments, and during various water-year types in accordance with subdivision (c). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan informational requirements of subdivisions (b) and (c), including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply.*

As part of the Urban Water Management Plans, California regulation requires water suppliers to quantify past and current water use and to project the total water demand for the water system. Projections of future water demand allow a water supplier to analyze if future water supplies are adequate, as well as help the agency when sizing and staging future water facilities. Water use and production records, combined with population and employment projections, provide the basis for estimating future water requirements. This chapter presents an analysis of water use data and the resulting projections for future water needs in the Cordova System.

Historical and Projected Water Use

Historical water use data from 1999 to 2004 was analyzed in order to estimate the future water demands for the Cordova System. Projections for the number of service connections and future water use were calculated for the year 2005 through 2030 in five-year increments. Future water demands were estimated based on the population projection by the Sacramento Area Council of Governments (SACOG) 2000 population, housing and employment data.

In the Cordova System, a large number of the connections are unmetered. GSWC is currently implementing a meter retrofit program with expected final completion in 2015. Table 4-1 shows the number of metered and unmetered connections from 1999 to 2004 for the Cordova System. For the metered connections, detailed information regarding the total number of connections for each account type and their average water uses were also available as shown in Table 4-2 and Table 4-3. For the unmetered connections, only the information regarding the number of connections was available as shown in Table 4-4. For the purpose of future water use projection analysis, historical water deliveries for the unmetered connections were estimated by assuming that all of the unmetered connections in the Cordova System are single-family connections. This is a reasonable assumption since approximately 97 percent of the unmetered connections are single-family as shown in Table 4-4.

Table 4-1
Historical Number of Connections and Total Water Sales for the Cordova System (1999-2004)

	1999	2000	2001	2002	2003	2004
Number of Metered Connections	2,484	2,528	2,600	3,123	3,392	3,886
Number of Unmetered Connections	9,854	9,796	9,838	9,843	9,832	9,815
Number of Total Connections	12,338	12,324	12,438	12,966	13,224	13,701
Total Sales for All Connections (ac-ft/yr)	16,089	15,880	16,580	16,718	16,978	18,212

Notes

1. Based on calendar year.

Table 4-2
Number of Metered Service Connections for the Cordova System (1999-2004)

Accounts by Type									
Year	Single Family	Multifamily	Commercial	Industrial	Institutional/ Government	Landscape	Agriculture	Other⁽³⁾	Total
1999 ⁽²⁾	798	176	951	97	117	316	2	27	2,484
2000	821	177	970	105	117	323	2	13	2,528
2001	849	178	991	135	117	325	2	3	2,600
2002	1,343	178	1,016	139	115	328	2	2	3,123
2003	1,582	178	1,023	141	116	347	2	3	3,392
2004	2,058	177	1,029	149	117	350	2	4	3,886

Notes

1. This table is based on the DWR Guidebook Table 12.
2. Based on calendar year.
3. Other accounts for any service connections not included in any other category, including idle or inactive connections.

Table 4-3
Water Deliveries for Metered Service Connections for the Cordova System in ac-ft/yr (1999-2004)

Accounts by Type									
Year	Single Family	Multifamily	Commercial	Industrial	Institutional/ Government	Landscape	Agriculture	Other⁽³⁾	Total
1999 ⁽²⁾	464	1,757	5,170	563	962	2,028	56	62	11,062
2000	478	1,767	5,274	610	962	2,072	56	30	11,248
2001	494	1,777	5,388	784	962	2,085	56	7	11,553
2002	782	1,777	5,524	807	946	2,105	56	5	12,000
2003	921	1,777	5,562	819	954	2,226	56	7	12,321
2004	1,198	1,767	5,595	865	962	2,246	56	9	12,697

Notes

1. This table is based on the DWR Guidebook Table 12.
2. Based on calendar year.
3. Other accounts for any service connections not included in any other category, including idle or inactive connections.

Table 4-4
Number of Unmetered Service Connections for the Cordova System (1999-2004)

Accounts by Type									
Year	Single Family	Multifamily	Commercial	Industrial	Institutional/ Government	Landscape	Agriculture	Other⁽³⁾	Total
1999 ⁽²⁾	9,599	249	0	0	0	6	0	0	9,854
2000	9,542	248	0	0	0	6	0	0	9,796
2001	9,584	248	0	0	0	6	0	0	9,838
2002	9,589	248	0	0	0	6	0	0	9,843
2003	9,578	248	0	0	0	6	0	0	9,832
2004	9,561	248	0	0	0	6	0	0	9,815

Notes

1. This table is based on the DWR Guidebook Table 12.
2. Based on calendar year.
3. Other accounts for any service connections not included in any other category, including idle or inactive connections.

In order to generate estimates of future water demands, all the newly built connections are assumed to be metered. The customer billing data for the metered connections from 1999 through 2004 were analyzed to obtain unit water use factors for 8 categories: single family, multi-family, industrial, commercial, institutional/government, landscape, agriculture, and others. For a given customer type, the unit water use factor is calculated as the total metered water sales for the category divided by the number of active metered service connections for that category. The unit water use factors for each customer type were averaged over the data range from 1999 through 2004 in order to obtain a representative water use factor that can be used for water demand projections by customer type. Table 4-5 shows the unit water use factors for the 8 categories used in the future projections.

Table 4-5
Unit Water Use Factors for the Cordova System Calculated from 1999-2004 Customer Billing Data (ac-ft/yr)

	Single Family	Multifamily	Commercial	Industrial	Institutional/ Government	Landscape	Agriculture	Other⁽²⁾
Unit Water Use Factor	0.6	10.0	5.4	5.8	8.2	6.4	28.0	2.3

Notes

1. Based on calendar year.
2. Other accounts for any service connections not included in any other category, including idle or inactive connections.

The water use projections are based on the population, housing, and employment projections by the Sacramento Area Council of Governments (SACOG) 2000 data. SACOG's methodology and the derivation of population projections for the Cordova System are discussed in more detail in Chapter 2.

SACOG household projections were used to determine the growth in single-family and multi-family service connections for the years 2005, 2010, 2015, 2020, 2025, and 2030. For example, the ratio between the household projections for the year 2015 and the year 2004 was multiplied by the number of service connections in 2004 to obtain a projection of the number of connections in the year 2015. Similarly, employment growth projections were used to determine the growth for commercial, industrial, institutional/government, landscape, and agriculture service connections. The projected water use was then calculated by multiplying the number of projected active service connections for each customer category with the corresponding customer average water use factor.

The projections of the number of total service connections (including both metered and unmetered connections) for each customer category, and the resulting water deliveries, are provided in Table 4-6 and Table 4-7 respectively.

Table 4-6
Projections of the Total Number of Service Connections for the Cordova System

Year	Accounts by Type								Total
	Single Family	Multifamily	Commercial	Industrial	Institutional/ Government	Landscape	Agriculture	Other ⁽⁴⁾	
2000 ^{(2) (3)}	10,363	425	970	105	117	329	2	13	12,324
2005	11,714	428	1,017	147	116	352	2	4	13,781
2010	12,232	447	1,111	161	126	385	2	4	14,470
2015	12,823	469	1,168	169	133	404	2	5	15,173
2020	12,823	469	1,194	173	136	413	2	5	15,215
2025	12,823	469	1,195	173	136	414	2	5	15,216
2030	12,823	469	1,195	173	136	414	2	5	15,216

Notes

1. This table is based on the DWR Guidebook Table 12.
2. Based on calendar year.
3. Total of Number of Metered Connections and Estimated Unmetered Connections.
4. Other accounts for any service connections not included in any other category, including idle or inactive connections.

Table 4-7
Projections of Water Deliveries for Service Connections for the Cordova System in ac-ft/yr

Accounts by Type									
Year	Single Family	Multifamily	Commercial	Industrial	Institutional/ Government	Landscape	Agriculture	Other⁽⁴⁾	Total
2000 ⁽²⁾⁽³⁾	5,110	1,767	5,274	610	962	2,072	56	30	15,880
2005	6,769	1,801	5,530	855	951	2,219	55	9	18,190
2010	7,070	1,990	6,043	934	1,039	2,429	60	10	19,576
2015	7,414	2,206	6,352	982	1,092	2,555	63	10	20,675
2020	7,414	2,206	6,493	1,004	1,117	2,612	65	11	20,921
2025	7,414	2,206	6,499	1,005	1,118	2,615	65	11	20,932
2030	7,414	2,206	6,499	1,005	1,118	2,615	65	11	20,932

Notes

1. This table is based on the DWR Guidebook Table 12.
2. Based on calendar year.
3. Total of Number of Metered Connections and Estimated Unmetered Connections.
4. Other accounts for any service connections not included in any other category, including idle or inactive connections.

Figure 4-1 shows the historical and projected number of total service connections (including both metered and unmetered connections) for the Cordova System from 1999 through 2030. Figure 4-2 shows the historical and projected water use for the Cordova System from 1988 until 2030.

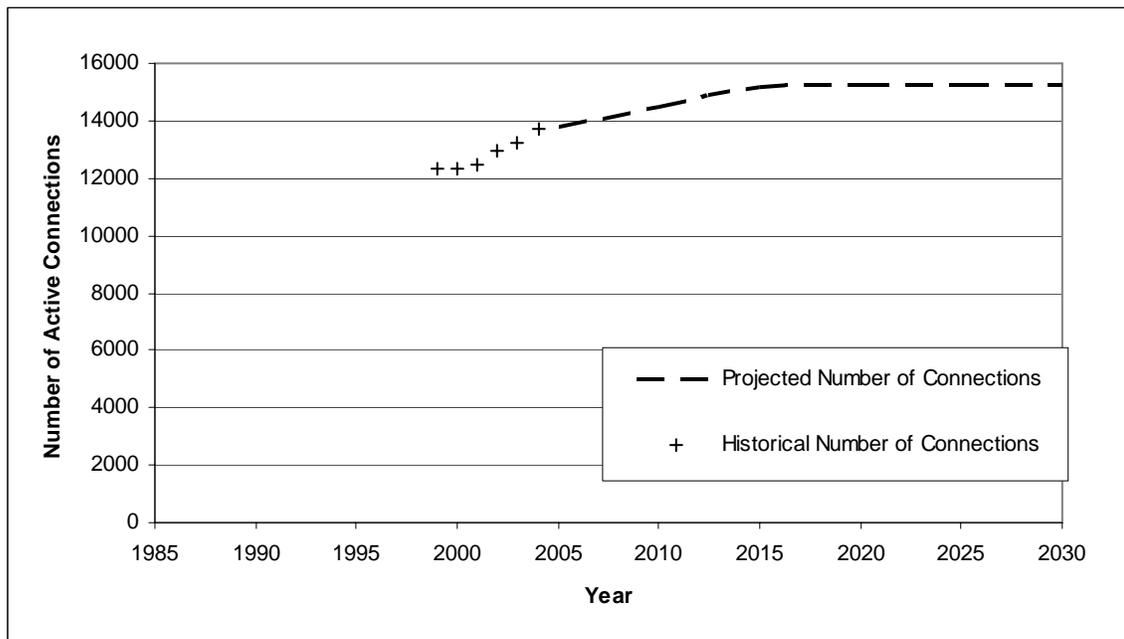


Figure 4-1. Historical and Projected Number of Service Connections (metered and unmetered connections)

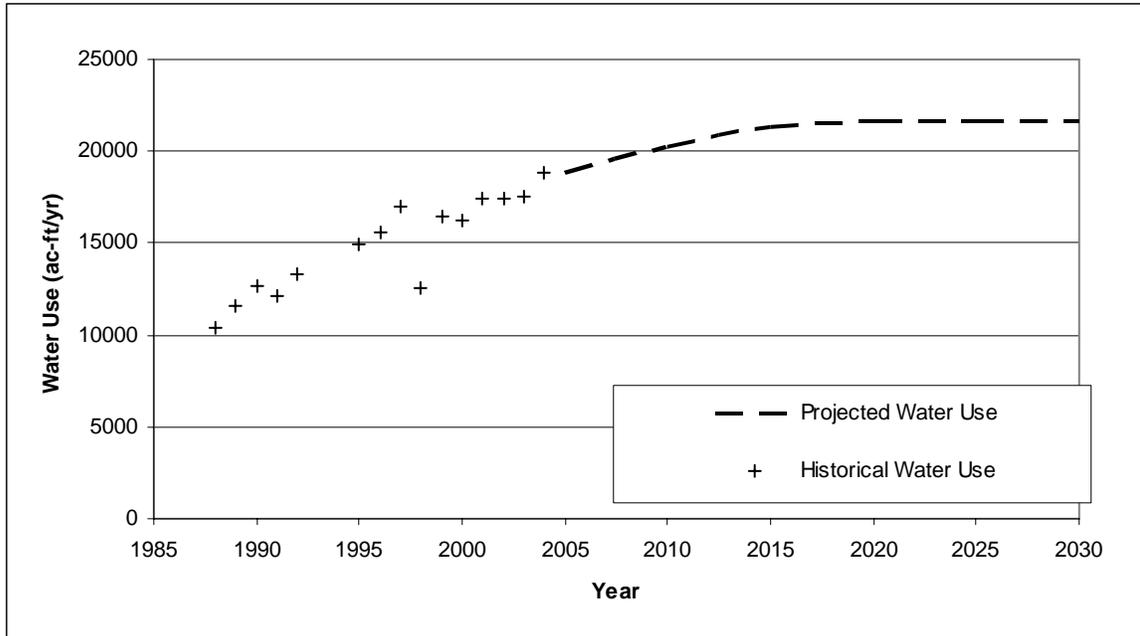


Figure 4-2. Historical Water Use and Future Water Use Projections(metered and unmetered connections)

Sales to Other Agencies

Beginning year 2006, GSWC plans to provide up to 1,000 gpm of water to the California-American Water Company as replacement water for their wells, which are impacted by the Aerojet contaminant plume. These water sales will typically occur during the peak summer season averaging 250 to 700 ac-ft/yr. For the purpose of the future water use projections, a conservative value of 700 ac-ft/yr is used. (Table 4-8).

Table 4-8
Sales to Other Agencies in ac-ft/yr

Water Distributed	2000 ⁽²⁾	2005	2010	2015	2020	2025	2030
California-American	-	-	700	700	700	700	700

Notes

1. This table is based on the DWR Guidebook Table 13.
2. Based on calendar year.

Other Water Uses and Unaccounted-for Water

In order to accurately predict total water demand, other water uses, as well as any water lost during conveyance, must be added to the customer demand. California regulation requires water suppliers to quantify any additional water uses not included as a part of water use by

customer type (Table 4-7). There are no other water uses in addition to those already reported in the Cordova System.

Unaccounted-for water must be incorporated when projecting total water demand. Unaccounted-for water is defined as the difference between annual production and supply and annual sales. Included in the unaccounted-for water are system losses (due to leaks, reservoir overflows, or inaccurate meters), and water used in operations. From 1999 through 2004, estimated unaccounted-for water has averaged 3.25 percent of the total production. Table 4-9 provides a summary of estimated unaccounted-for water in the Cordova System.

Table 4-9
Additional Water Uses and Losses in ac-ft/yr

Water-Use Type	2000⁽²⁾	2005	2010	2015	2020	2025	2030
Other Water Uses	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Unaccounted-for System Losses ⁽³⁾	346	610	657	693	702	702	702
Total	346	610	657	693	702	702	702

Notes

1. This table is based on the DWR Guidebook Table 14.
2. Based on calendar year.
3. Unaccounted-for water includes system losses due to leaks, reservoir overflows, and inaccurate meters, as well as water used in operations.
4. N/A – Not Applicable

Total Water Demand

As mentioned above, other water uses, as well as any water lost during conveyance, must be added to the customer demand in order to project water demand for the Cordova System. Although there are no other water uses contributing to the total water demand in the Cordova System, unaccounted-for water must be incorporated into the total water demand (refer to the previous section for a definition of unaccounted-for water). Table 4-10 summarizes the projections of water sales, unaccounted-for water, and total water demand through the year 2030.

The water demand projections below do not include any reduction due to future implementation of Demand Management Measures (DMM). More information regarding the status of demand reduction measures is available in Chapter 5.

Table 4-10
Projected Water Sales, Unaccounted-for System Losses, and Total Water Demand in ac-ft/yr

Year	Projected Water Sales	Unaccounted-for System Losses	Sales to Other Agencies	Total Water Demand
2000 ⁽²⁾	15,880	346	0	16,226
2005	18,190	610	0	18,800
2010	19,576	657	700	20,933
2015	20,675	693	700	22,068
2020	20,921	702	700	22,323
2025	20,932	702	700	22,334
2030	20,932	702	700	22,334

Notes

1. This table is based on the DWR Guidebook Table 15.
2. Based on calendar year.

Data Provided to Wholesale Agency

GSWC does not obtain water from any wholesale agency for the Cordova System (see Chapter 3 for details regarding water supply sources.) Therefore, Table 4-41 has intentionally been left blank.

Table 4-41
Summary of Cordova System Data Provided to Wholesale Agency

Wholesaler	2010	2015	2020	2025	2030
N/A	N/A	N/A	N/A	N/A	N/A

Notes

1. This table is based on the DWR Guidebook Table 19.
2. N/A – Not Applicable

Chapter 5. Demand Management Measures

The evaluation of Demand Management Measures (DMMs) occupies a significant portion of the Act. The Act states as follows:

Section 10631

- (f) *Provide a description of the supplier's water demand management measures. This description shall include all of the following:*
- (1) *A description of each water demand management measure that is currently being implemented, or scheduled for implementation, including the steps necessary to implement any proposed measures, including, but not limited to, all of the following:*
 - (A) *Water survey programs for single-family residential and multifamily residential customers.*
 - (B) *Residential plumbing retrofit.*
 - (C) *System water audits, leak detection, and repair.*
 - (D) *Metering with commodity rates for all new connections and retrofit of existing connections.*
 - (E) *Large landscape conservation programs and incentives.*
 - (F) *High-efficiency washing machine rebate programs.*
 - (G) *Public information programs.*
 - (H) *School education programs.*
 - (I) *Conservation programs for commercial, industrial, and institutional accounts.*
 - (J) *Wholesale agency programs.*
 - (K) *Conservation pricing.*
 - (L) *Water conservation coordinator.*
 - (M) *Water waste prohibition.*
 - (N) *Residential ultra-low-flush (ULF) toilet replacement programs.*
 - (2) *A schedule of implementation for all water demand management measures proposed or described in the plan.*
 - (3) *A description of the methods, if any, that the supplier will use to evaluate the effectiveness of water demand management measures implemented or described under the plan.*
 - (4) *An estimate, if available, of existing conservation savings on water use within the supplier's service area, and the effect of the savings on the supplier's ability to further reduce demand.*
- (g) *An evaluation of each water demand management measure listed in paragraph (1) of subdivision (f) that is not currently being implemented or scheduled for implementation. In the course of the evaluation, first consideration shall be given to water demand management measures, or combination of measures, that offer lower incremental costs than expanded or additional water supplies. This evaluation shall do all of the following:*
- (1) *Take into account economic and noneconomic factors, including environmental, social, health, customer impact, and technological factors.*
 - (2) *Include a cost-benefit analysis, identifying total benefits and total costs.*

- (3) *Include a description of funding available to implement any planned water supply project that would provide water at a higher unit cost.*
- (4) *Include a description of the water supplier's legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation.*
- (j) *Urban water suppliers that are members of the California Urban Water Conservation Council and submit annual reports to that Council in accordance with the "Memorandum of Understanding Regarding Urban Water Conservation in California," dated September 1991, may submit the annual reports identifying water demand management measures currently being implemented, or scheduled for implementation, to satisfy the requirements of subdivisions (f) and (g).*

Section 10631.5. The department shall take into consideration whether the urban water supplier is implementing or scheduled for implementation, the water demand management activities that the urban water supplier identified in its urban water management plan, pursuant to Section 10631, in evaluating applications for grants and loans made available pursuant to Section 79163. The urban water supplier may submit to the department copies of its annual reports and other relevant documents to assist the department in determining whether the urban water supplier is implementing or scheduling the implementation of water demand management activities.

This chapter presents a summary of Golden State Water Company's (GSWC) past, current and future water conservation activities for the Cordova System in compliance with the above listed sections of the Act.

The water conservation practices, as defined by the Act, are comprised of 14 DMMs. The DMMs are functionally equivalent to urban water conservation best management practices (BMPs) administered by the California Urban Water Conservation Council (Council). Table 5-1 lists the BMPs.

The Council was formed as part of an effort by the Department of Water Resources (DWR) working jointly with water utilities, environmental organizations, and other interested groups to develop and administer urban best management practices (BMPs) for conserving water. In 1991 the Council issued a Memorandum of Understanding Regarding Urban Water Conservation in California (MOU) which formalized the agreement to implement BMPs to reduce the consumption of California's water resources. As a signatory of the MOU, GSWC has agreed to implement the BMPs that are determined to be cost beneficial to its ratepayers and to complete such implementation in accordance with the schedule assigned to each BMP. GSWC files bi-annual reports with the Council on BMPs implementation progress.

Table 5-1
Water Conservation Best Management Practices

1	Water Survey Programs for Single-Family Residential and Multifamily Residential Customers
2	Residential Plumbing Retrofits
3	System Water Audits, Leak Detection, and Repair
4	Metering with Commodity Rates for All New Connections and Retrofit of Existing Connections
5	Large-Landscape-Conservation Programs and Incentives
6	High-Efficiency-Washing-Machine Rebate Programs
7	Public Information Programs ⁽¹⁾
8	School Education Programs ⁽¹⁾
9	Conservation Program for Commercial, Industrial, Institutional (CII) Accounts
10	Wholesale-Agency Assistance Programs ⁽¹⁾
11	Conservation Pricing ⁽¹⁾
12	Water Conservation Coordinator ⁽¹⁾
13	Water Waste Prohibition ⁽¹⁾
14	Residential Ultra-Low-Flush-Toilet (ULFT) Replacement Programs

Notes

1. Economic benefits of these BMPs are considered nonquantifiable.

BMP Implementation Status

GSWC implements water conservation programs by district or customer service area (CSA) rather than for each individual system. Because of this, water conservation was evaluated for the entire Arden-Cordova CSA, which consists of the Arden and Cordova Systems.

The BMP implementation status was assessed based on information provided in BMP activity reports for the years 2001 to 2004 that were filed with the Council. Historically, the BMP forms for the Arden-Cordova CSA have been 100 percent complete, including the reports filed for 2001 to 2004. In addition, the BMP coverage reports were used to assess whether the target implementation schedule, as defined by the Council, for each BMP is met. The 2004 Activity Report and Coverage Report are included in Appendix E. Based on Section 10631 (j) the Council reports meet the requirements of Water Code Section 10631 (f) and (g). A summary of these reports is presented in Table 5-2 and Table 5-3.

Table 5-2 presents a summary of the past water conservation activities in the Arden-Cordova CSA. It should be noted GSWC takes credit for water conservation activities completed under programs jointly offered by GSWC and other agencies in its service area.

Table 5-3 presents a description of the offered programs and implementation status in the Arden-Cordova CSA for all BMPs. GSWC is currently not meeting coverage requirements as defined by the Council for BMPs 1, 2, 3, 4, 5, 6, 9, and 14. In order to determine if implementation of these BMPs for the Arden-Cordova CSA should continue, a benefit-cost analysis was performed on these BMPs.

Table 5-2
Summary of Past Water Conservation Activities⁽¹⁾

Year	BMP 1: Residential Surveys	BMP 2: Residential Retrofits	BMP 3: Pre- Screening System Water Audit	BMP 4: Retrofit Existing Unmetered Connections	BMP 5: Large Landscape Surveys	BMP 6: High Efficiency Washing Machine Rebate	BMP 7: Public Information Programs	BMP 8: School Programs Students Reached	BMP 9: CII Surveys	BMP 14: Residential ULFT
Pre 2000		7370	No				Yes			1259
2000		3000	No	15			Yes	960		8
2001			No	5			Yes	1110		
2002			No	20			Yes	1050		100
2003		150	No	10			Yes	6690		40
2004		2000	No	5			Yes	6700		100
Meeting Coverage Requirements	No	No	No	No	No	No	Yes	Yes	No	No

Notes

1. BMPs 11, 12, and 13 are fully implemented. BMP 10 is not applicable as this system does not provide wholesale water to other agencies.

Table 5-3
Summary of Best Management Practice Implementation

	BMP	Summary of Activities	Coverage Implementation ⁽²⁾ Status
1	Residential Water Surveys	Program currently not offered.	Coverage requirements are not met.
2	Residential Plumbing Retrofits	Water conservation materials are available through programs offered by the Regional Water Authority (RWA). GSWC has allocated \$5,250 for FY 2006 for this BMP, and is planning to work with "Welcome Wagon" organizations to distribute literature and showerhead kits to new residents.	Coverage requirements are not met.
3	System Water Audits, Leak Detection, and Repair	GSWC is developing a program for system audits. \$150,000 is budgeted for FY 2006 for this BMP.	Coverage requirements are not met.
4	Metering	A program for retrofitting existing non-metered connections has been developed (Water Forum Agreement), and \$150,000 is budgeted for FY 2006 to implement this BMP.	Coverage requirements are not met.
5	Large-Landscape-Conservation Program	Water conservation materials and training are available through programs offered by the Regional Water Authority (RWA).	Coverage requirements are not met.
6	High-Efficiency-Washing-Machine Rebate Program	Rebates for high-efficiency washers were offered through Sacramento Municipal Utility District prior to 2004. GSWC will begin offering rebates in FY 2006.	Coverage requirements are not met.
7	Public Information Program ⁽¹⁾	Arden-Cordova CSA has a public information program. GSWC is a member of the RWA, which provides speakers, media announcements, and conservation materials.	Coverage requirements are being met.
8	School Education Program ⁽¹⁾	GSWC has implemented a school education program in all grades K through 12.	Coverage requirements are being met.
9	Conservation Program CII Accounts	GSWC participates in "Rinse and Save" program offered by the Regional Water Authority, where high-performance pre-rinse nozzles are installed free of charge in restaurants.	Coverage requirements are not met.
10	Wholesale-Agency Program ⁽¹⁾	Not applicable.	Not applicable
11	Conservation Pricing ⁽¹⁾	GSWC has adopted conservation pricing, including using water rates that are developed to recover the cost of providing service and billing customers for metered water use. For metered accounts, GSWC has a tiered rate structure and for unmetered accounts GSWC has a flat rate structure (i.e. no rate increase/decrease based on the quantity of water used).	Fully implemented.
12	Water Conservation Coordinator ⁽¹⁾	GSWC has a part time water conservation coordinator on staff for all of Region I service areas.	Coverage requirements are being met.
13	Water Waste Prohibition ⁽¹⁾	There is a water waste prohibition ordinance in effect in the Arden-Cordova CSA (CPUC Tariff Rule No. 14.1).	Fully implemented.
14	Residential-Ultra-Low-Flush-Toilet-Replacement Program	Rebates for residential ULFT are offered through the RWA. GSWC encourages its customers to participate. \$10,500 was budgeted for FY 2006 to continue to implement this BMP.	Coverage requirements are not met.

Notes

1. Benefits of these DMM's are considered non-quantifiable.
2. "Implementation" means achieving and maintaining the staffing, funding, and priority levels necessary to achieve the level of activity required to satisfy the target commitment as described in the MOU.

Cost Benefit Analysis

A benefit-cost economic analysis was completed for the quantifiable BMPs that are not meeting coverage requirements (BMP 1, 2, 3, 4, 5, 6, 9, and 14). The benefit-cost analysis was completed with the consideration of economic factors. Noneconomic factors, including environmental, social, health, customer impacts, and new technology, are not believed to be significant and were not considered in the analysis.

The basis and assumptions used in the economic analysis of each BMP, as well as detailed calculations are included in Appendix D. Common assumption for all BMPs is the value of conserved water. Based on information provided by GSWC, the value of water for the Arden-Cordova CSA is \$300 per acre-foot. This value was estimated based on the cost of developing new water supply and the real discount rate of 6.71 percent. The analysis assumes that BMPs 1 and 2 (Residential Water Surveys and Plumbing Retrofits) would be done concurrently. Other assumptions with supporting references are described in Table D-1 (Appendix D).

The economic analysis was performed using a spreadsheet program developed by the Council. A separate, customized worksheet for each BMP is presented in Table D-2 (Appendix D). Each BMP economic analysis spreadsheet projects on an annual basis the number of interventions and the dollar values of the benefits and costs that would result from fully implementing a particular BMP. The definition of terms and formulas that are common to all worksheets are presented in Table D-3 (Appendix D).

Table 5-4 summarizes the results of the economic analysis. The table presents the total discounted costs and benefits, the benefit-cost ratio, the simple pay-back period, the discounted cost per acre-foot of water saved, and the net present value (NPV) per acre-foot of water saved for each BMP.

The economic analysis shows that BMPs 1, 5, and 9 yield benefit-cost ratios greater than one, which indicates that the conservation measures are cost effective. Based on this, GSWC should continue efforts to implement these BMPs.

BMPs 2 (Residential Plumbing Retrofits), 3 (System Water Audits and Leak Repair), 4 (Retrofit Existing Unmetered Connections), and 14 (Residential ULFT Replacement Programs) result in slightly higher costs when compared to the value of water that is saved, and benefit cost ratio of less than one. Signatories of the MOU are not required to implement BMPs that are not cost beneficial. Therefore, GSWC is not required to continue implementation of BMPs 2, 3, and 14 and should pursue an exemption from implementing these measures with the Council. Although BMP 4 was also found to have a benefit-cost ratio less than one, GSWC is legally required to implement BMP 4 by regulations independent of the Act.

Benefit-cost analysis was not completed for BMP 6 (High-Efficiency Washing Machine Rebate Program), because financial incentives are currently not offered by energy service providers in this CSA.

Based on the results of the benefit-cost analysis an implementation program was developed for the cost effective BMPs.

Table 5-4
Results of Economic Analysis for BMPs Currently not Meeting Coverage Requirements

	BMP Description	Total Discounted Cost⁽¹⁾	Total Discounted Benefits⁽²⁾	Total Water Saved (ac-ft)⁽³⁾	Benefit/Cost Ratio⁽⁴⁾	Simple Payback Analysis (years)⁽⁵⁾	Discounted Cost/Water Saved (\$/ac-ft)⁽⁶⁾	Net Present Value/Water Saved (\$/ac-ft)⁽⁷⁾
1	Water Survey Programs for Residential Customers	\$74,207	\$85,480	284	1.2	4	\$262	\$40
2	Residential Plumbing Retrofits	\$273,522	\$172,322	762	0.63	25	\$359	-\$133
3	System Water Audits and Leak Repair	\$263,006	\$230,149	1,421	0.9	22	\$185	-\$23
4	Retrofit Existing Unmetered Connections	\$7,402,563	\$4,021,781	1,510	0.5	37	\$316	-\$144
5	Large Landscape Conservation Programs and Incentives	\$228,055	\$523,870	1,858	2.3	2	\$123	\$159
9	Conservation Program for CII Accounts	\$49,949	\$86,081	286	1.7	3	\$175	\$126
14	Residential ULFT Replacement Programs	\$496,650	\$379,572	2,277	0.8	31	\$218	-\$51

Notes

1. Present value of the sum of financial incentives and operating expenses - using discount rate of 6.71%.
2. Present value of the sum of avoided energy and purchased water costs - using discount rate of 6.71%.
3. Achieved water savings for the implemented BMP.
4. Total discounted benefits divided by total discounted costs.
5. Time horizon in years required for benefits to pay back costs of the BMP.
6. Total discounted costs divided by total water saved.
7. Total of discounted benefits less discounted costs divided by total water saved.

Recommended Conservation Program

GSWC should continue efforts to implement BMPs that are assessed to be cost beneficial (benefit-cost ratio equal or greater than one), and to achieve the target implementation coverage by the end of the implementation period assigned to each BMP.

BMPs 1, 5, and 9 were identified as cost beneficial in the Arden-Cordova CSA; therefore, an implementation program was developed for these BMPs. The program is based on achieving the target coverage requirements, as per the MOU.

Table 5-5 presents the proposed implementation program, including the number of annual interventions required for each BMP to comply with defined coverage requirements; the total annual expenditures necessary to support the interventions; and the estimated annual water savings. The expenditures for BMPs take into consideration the existing programs offered by other agencies in the service area, and reflect only the incremental cost to GSWC to implement BMPs to meet the coverage requirements.

BMPs 7, 8, 10, 11, 12, and 13 were not included in the proposed implementation program because they are considered non-quantifiable. These BMPs have no specific level of effort defined in the MOU, therefore water savings and costs associated with these BMPs were not included in the analysis. BMP 11 is already implemented and the cost for BMP 12 is contained in GSWC overhead; therefore, no additional costs are associated with BMPs 11 and 12. BMP 13 has no associated cost unless initiated by a water shortage condition.

When implementing water conservation programs, GSWC is subject to economic and legal constraints that need to be considered as they may affect the proposed BMPs implementation schedule.

Economic Considerations

As a private utility, GSWC is subject to the rules and regulations of the California Public Utilities Commission (CPUC). The CPUC approve GSWC's water rate structure and the capital and operating budget, including the budget for implementation of water conservation measures. GSWC is often constrained in the funding available to implement programs. GSWC implements cost effective water conservation programs that have been approved by the CPUC.

While GSWC is fully committed to optimizing its available water resources and implementation of BMP's and DMM's, the Company is currently limited in its ability to do so by certain ratesetting practices of the CPUC. As noted above, the CPUC's draft "Water Action Plan" has as one of its major objectives strengthening water conservation programs to a level comparable to those of energy utilities. While implementation measures have not yet been identified by the CPUC, GSWC has proposed specific changes to current CPUC ratesetting practices which will, as a practical matter, support implementation of the WAP conservation objectives and greatly enhanced DMM's.

The cost of water is an important economic factor that needs to be considered when implementing conservation programs. Higher cost of water increases the attractiveness of BMPs implementation. Currently there are no water projects planned in the Arden-Cordova CSA that would result in higher unit cost of water, thus increasing the feasibility of implementing water conservation measures.

Legal Considerations

GSWC has the legal authority to implement cost beneficial BMPs that were approved by the CPUC in its capital/operating budget. When developing programs that advance water conservation, GSWC can offer financial incentives, information or educational programs in its service area; however, GSWC has no legal authority to enforce urban codes or plumbing codes for new or existing connections that pertain to implementation of efficient devices, or reduction of water use.

Ordinances that prohibit water waste (BMP 13) are jointly developed by CPUC and GSWC. Ordinances are enacted by the CPUC only during water shortages. As a water retailer, GSWC has no legal authority to enact or enforce waste water prohibition ordinances without CPUC approval.

Cost Share Partners

In an effort to expand the breadth of offered programs GSWC, partners with wholesale suppliers, energy utilities, and other agencies that support conservation programs. Joint participation offers opportunity for cost sharing and development of more effective conservation strategies.

GSWC is a member of the Regional Water Authority (RWA). The RWA is a joint powers authority that serves and represents the interests of 21 water providers in the greater Sacramento, Placer and El Dorado County region. The RWA administers a Water Efficiency Program (WEP) for its members, that provides products and services to water interests so that they may meet the implementation requirements for BMPs. GSWC participates in programs offered by RWA by providing additional funding or resources to implement offered programs. The additional funding may include additional rebate offers, program advertising, or sharing of costs related to organizing events in its service area. Supplementary funding for RWA programs may sometimes be provided by grants from the U.S. Bureau of Reclamation, California Department of Water Resources, Sacramento Regional County Sanitation District, and other sources, as available.

GSWC is committed to continue efforts to implement cost effective BMPs that are approved by the CPUC, and to achieve, to the extent possible, target implementation coverage by the end of the implementation period assigned to each BMP.

Table 5-5
 Summary of Required Interventions, Implementation Cost and Estimated Water Saved for BMPs Not Meeting Coverage Requirements

Year	BMP 1: Residential Water Surveys			BMP 5: Large Landscapes			BMP 9: CII Conservation			Total		
	Interven- tions	Water Saved (ac-ft/yr)	Cost (\$/yr)	Interven- tions	Water Saved (ac-ft/yr)	Cost (\$/yr)	Interven- tions	Water Saved (ac-ft/yr)	Cost (\$/yr)	Interven- tions	Water Saved (ac-ft/yr)	Cost (\$/yr)
2006	1095	35	\$38,308	201	230	\$122,855	40	36	\$25,785	1336	302	\$186,948
2007	1095	71	\$35,899	201	461	\$122,855	40	71	\$25,785	1336	603	\$184,540
2008	0	71	\$0	16	462	\$2,360	0	71	\$0	16	604	\$2,360
2009	0	71	\$0	16	463	\$2,360	0	71	\$0	16	606	\$2,360
2010	0	35	\$0	6	233	\$908	0	36	\$0	6	305	\$908
2011	0	0	\$0	6	4	\$908	0	0	\$0	6	4	\$908
2012	0	0	\$0	0	2	\$0	0	0	\$0	0	2	\$0
2013	0	0	\$0	0	1	\$0	0	0	\$0	0	1	\$0
2014	0	0	\$0	0	0	\$0	0	0	\$0	0	0	\$0
2015	0	0	\$0	0	0	\$0	0	0	\$0	0	0	\$0
2016	0	0	\$0	0	0	\$0	0	0	\$0	0	0	\$0
2017	0	0	\$0	0	0	\$0	0	0	\$0	0	0	\$0
2018	0	0	\$0	0	0	\$0	0	0	\$0	0	0	\$0
2019	0	0	\$0	0	0	\$0	0	0	\$0	0	0	\$0
2020	0	0	\$0	0	0	\$0	0	0	\$0	0	0	\$0
2021	0	0	\$0	0	0	\$0	0	0	\$0	0	0	\$0
2022	0	0	\$0	0	0	\$0	0	0	\$0	0	0	\$0
2023	0	0	\$0	0	0	\$0	0	0	\$0	0	0	\$0
2024	0	0	\$0	0	0	\$0	0	0	\$0	0	0	\$0
2025	0	0	\$0	0	0	\$0	0	0	\$0	0	0	\$0
2026	0	0	\$0	0	0	\$0	0	0	\$0	0	0	\$0
2027	0	0	\$0	0	0	\$0	0	0	\$0	0	0	\$0
2028	0	0	\$0	0	0	\$0	0	0	\$0	0	0	\$0
2029	0	0	\$0	0	0	\$0	0	0	\$0	0	0	\$0
2030	0	0	\$0	0	0	\$0	0	0	\$0	0	0	\$0
Total	2,189	284	\$74,207	445	1,858	\$252,248	81	286	\$51,570	2,715	2,427	\$378,025

Chapter 6. Desalination

The Act requires that desalination opportunities be discussed in the UWMP. The Act states:

Section 10631

- (i) *Describe the opportunities for development of desalinated water, including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply.*

There are no opportunities identified for using desalinated water as a source of water supply for the Cordova System. Therefore, Table 3-11, has been intentionally left blank.

Table 6-1
Summary of Opportunities for Water Desalination

Source of Water	Yield (ac-ft/yr)	Start Date	Type of Use	Other
N/A	N/A	N/A	N/A	N/A

Notes

1. Table format based on DWR Guidance Document Table 18
2. N/A – Not applicable

Chapter 7. Water Shortage Contingency Plan

Section 10632 of the Act details the requirements of the water-shortage contingency analysis. The Act states the following:

Section 10632. The plan shall provide an urban water-shortage contingency analysis that includes each of the following elements that are within the authority of the urban water supplier:

- (a) Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply, and an outline of specific water supply conditions, which are applicable to each stage.*
- (b) An estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency's water supply.*
- (c) Actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.*
- (d) Additional, mandatory prohibitions against specific water-use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.*
- (e) Consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water-use reduction consistent with up to a 50 percent reduction in water supply.*
- (f) Penalties or charges for excessive use, where applicable.*
- (g) An analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.*
- (h) A draft water shortage contingency resolution or ordinance.*
- (i) A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.*

This chapter documents GSWC's Water Shortage Contingency Plan for the Cordova System per requirements of Section 10632 of the Act. The Water Shortage Contingency Plan is based on Rule No. 14.1 Mandatory Water Conservation, Restrictions and Ratings Program adopted by GSWC. Appendix F contains the full text of the rule.

The purpose of the Water Shortage Contingency Plan is to provide a plan of action to be followed during the various stages of a water shortage. The plan includes the following elements: action stages, estimate of minimum supply available, actions to be implemented during a catastrophic interruption of water supplies, prohibitions, penalties and consumption reduction methods, revenue impacts of reduced sales, and water use monitoring procedures.

Action Stages

The Act requires documentation of actions to be undertaken during a water shortage. GSWC has developed actions to be undertaken in response to water supply shortages, including up to a 50 percent reduction in water supply. Implementation of the actions is dependent upon approval of the California Public Utilities Commission (CPUC), especially for implementing mandatory water use restriction. CPUC has jurisdiction over GSWC because GSWC is an investor-owned water utility. Section 357 of the California Water Code requires that suppliers that are subject to regulation by the CPUC secure its approval before imposing water consumption regulations and restrictions required by water supply shortage emergencies. GSWC has proposed that the CPUC support implementation of water shortage allocation policies by amending Commission Rule 14.1 to (a) adopt specific rationing rates and restrictor valve removal fees; and (b) provide for a shortened authorization period to implement emergency measures such as mandatory conservation and rationing in order to effectively manage water shortages.

GSWC has grouped the actions to be taken during a water shortage into four stages, I through IV, that are based on the water supply conditions. Table 7-1 describes the water supply shortage stages and conditions. The stages will be implemented during water supply shortages according to shortage level, ranging from 5 percent shortage in Stage I to 50 percent shortage in Stage IV. The stage determination and declaration during a water supply shortage will be made by the Regional Vice President Customer Service.

Table 7-1
Water Supply Shortage Stages and Conditions

Stage No.	Water Shortage Supply Conditions	Shortage Percent
I	Minimum	5 - 10
II	Moderate	10 - 20
III	Severe	20 - 35
IV	Critical	35 - 50

Notes

1. This table is based on the DWR Guidebook Table 23.

The actions to be undertaken during each stage include, but are not limited to, the following:

Stage I (5 - 10 percent shortage) - Water alert conditions are declared and voluntary conservation is encouraged. The drought situation is explained to the public and governmental bodies. GSWC explains the possible subsequent water shortage stages in order to forecast possible future actions for the customer base. The activities performed by GSWC during this stage include, but are not limited to:

- Public information campaign consisting of distribution of literature, speaking engagements, bill inserts, and conversation messages printed in local newspapers
- Educational programs in area schools

- Conservation Hotline, a toll free number with trained Conservation Representatives to answer customer questions about conservation and water use efficiency

Stage II (10 - 20 percent shortage) – Stage II will include actions undertaken in Stage I. In addition, GSWC may propose voluntary conservation allotments and/or require mandatory conservation rules. The severity of actions depends upon the percent shortage. The level of voluntary or mandatory water use reduction requested from the customers is also based on the severity. It needs to be noted that prior to implementation of any mandatory reductions, GSWC must obtain approval from CPUC. If necessary, GSWC may also support passage of drought ordinances by appropriate governmental agencies.

Stage III (20 - 35 percent shortage) – Stage III is a severe shortage that entails or includes allotments and mandatory conservation rules. This phase becomes effective upon notification by the GSWC that water usage is to be reduced by a mandatory percentage. GSWC implements mandatory reductions after receiving approval from CPUC. Rate changes are implemented to penalize excess usage. Water use restrictions are put into effect, i.e. prohibited uses can include restrictions of daytime hours for watering, excessive watering resulting in gutter flooding, using a hose without a shutoff device, use of non-recycling fountains, washing down sidewalks or patios, unrepaired leaks, etc. GSWC monitors production weekly for compliance with necessary reductions. Use of flow restrictors is implemented, if abusive practices are documented.

Stage IV (35 - 50 percent shortage) – This is a critical shortage that includes all steps taken in prior stages regarding allotments and mandatory conservation. All activities are intensified and production is monitored daily by GSWC for compliance with necessary reductions.

Minimum Supply

The Act requires an estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for GSWC's water supply.

Table 7-2 summarizes the minimum volume of water available from each source during the next three years based on multiple-dry water years and normal water year. The driest three-year historic sequence is provided in Chapter 3. The water supply quantities from 2006 to 2008 are calculated by linearly interpolating the projected water supplies of 2005 and 2010. The water supplies for meeting the projected demands are presented in Chapter 3. GSWC plans to provide up to 700 ac-ft/yr to the California-American Company starting from 2006 (see Chapter 4 for details). A demand of 700 ac-ft/yr was added to the projected demands for 2006, 2007, and 2008. It is assumed that the multiple-dry year supplies will be the same as those for the normal years because the supplies from the American River and local groundwater will meet projected water demands under all anticipated hydrologic conditions.

In general, GSWC's supply is expected to be 100 percent reliable through 2030. This reliability is a result of: 1) highly reliable surface water supplies from the American River, 2) the Settlement Agreement, and 3) historically reliable groundwater supply from the Central Sacramento Basin (see Chapters 3 and 10 for details).

Table 7-2
Three-Year Estimated Minimum Water Supply in ac-ft/yr

Source	2006	2007	2008	2005 Average year
Surface Water	10,000	10,000	10,000	10,000
Groundwater	9,787	10,073	10,360	8,800
Recycled water	0	0	0	0
Total	19,787	20,073	20,360	18,800

Notes

1. This table is based on the DWR Guidebook Table 24.

Catastrophic Supply Interruption Plan

The Act requires documentation of actions to be undertaken by the water supplier to prepare for, and implement during a catastrophic interruption of water supplies. A catastrophic interruption constitutes a proclamation of a water shortage and could be any event (either natural or man-made) that causes a water shortage severe enough to classify as either a Stage III or Stage IV water supply shortage condition.

In order to prepare for catastrophic events, GSWC has prepared an Emergency Response Plan (ERP) in accordance with other state and federal regulations. The purpose of this plan is to design actions necessary to minimize the impacts of supply interruptions due to catastrophic events.

The ERP coordinates overall company response to a disaster in any and all of its districts. In addition, the ERP requires each district to have a local disaster plan that coordinates emergency responses with other agencies in the area. The ERP also provides details on actions to be undertaken during specific catastrophic events. Table 7-3 provides a summary of actions cross-referenced against specific catastrophes for three of the most common possible catastrophic events: regional power outage, earthquake, and malevolent acts.

In addition to specific actions to be undertaken during a catastrophic event, GSWC performs maintenance activities, such as annual inspections for earthquake safety, and budgets for spare items, such as auxiliary generators, to prepare for potential events.

Table 7-3
Summary of Actions for Catastrophic Events

Possible Catastrophe	Summary of Actions
Regional power outage	<ul style="list-style-type: none"> • Isolate areas that will take the longest to repair and/or present a public health threat. Arrange to provide emergency water. • Establish water distribution points and ration water if necessary. • If water service is restricted, attempt to provide potable water tankers or bottled water to the area. • Make arrangements to conduct bacteriological tests, in order to determine possible contamination. • Utilize backup power supply to operate pumps in conjunction with elevated storage.
Earthquake	<ul style="list-style-type: none"> • Assess the condition of the water supply system. • Complete the damage assessment checklist for reservoirs, water treatment plants, wells and boosters, system transmission and distribution. • Coordinate with OES utilities group or fire district to identify immediate fire fighting needs. • Isolate areas that will take the longest to repair and/or present a public health threat. Arrange to provide emergency water. • Prepare report of findings, report assessed damages, advise as to materials of immediate need and identify priorities including hospitals, schools and other emergency operation centers. • Take actions to preserve storage. • Determine any health hazard of the water supply and issue any “Boil Water Order” or “Unsafe Water Alert” notification to the customers, if necessary. • Cancel the order or alert information after completing comprehensive water quality testing. • Make arrangements to conduct bacteriological tests, in order to determine possible contamination.
Malevolent acts	<ul style="list-style-type: none"> • Assess threat or actual intentional contamination of the water system. • Notify local law enforcement to investigate the validity of the threat. • Get notification from public health officials if potential water contamination • Determine any health hazard of the water supply and issue any “Boil Water Order” or “Unsafe Water Alert” notification to the customers, if necessary. • Assess any structural damage from an intentional act. • Isolate areas that will take the longest to repair and or present a public health threat. Arrange to provide emergency water.

Notes

1. This table is based on the DWR Guidebook Table 25.

Prohibitions, Penalties, and Consumption Reduction Methods

The Act requires an analysis of mandatory prohibitions, penalties, and consumption reduction methods against specific water use practices which may be considered excessive during water shortages. Given that GSWC is an investor owned entity, it does not have the authority to pass any ordinances enacting specific prohibitions or penalties. In order to enact or rescind any prohibitions or penalties, GSWC would seek approval from CPUC to enact or rescind Rule No. 14.1, Mandatory Conservation and Rationing, which is presented in Appendix F. When Rule No. 14.1 has expired or is not in effect, mandatory conservation and rationing measures will not be in force.

Rule No. 14.1 details the various prohibitions and sets forth water use violation fines, charges for removal of flow restrictors, as well as establishes the period during which mandatory conservation and rationing measures will be in effect. The prohibitions on various wasteful water uses, include, but are not limited to, the hose washing of sidewalks and driveways using potable water, and cleaning for filling decorative fountains. Table 7-4 summarizes the various prohibitions and the stages during which the prohibition becomes mandatory.

Table 7-4
Summary of Mandatory Prohibitions

Examples of Prohibitions	Stage When Prohibition Becomes Mandatory
Uncorrected plumbing leaks	II, III, IV
Watering which results in flooding or run-off in gutters, waterways, patios, driveway, or streets	II, III, IV
Washing aircraft, cars, buses, boats, trailers, or other vehicles without a positive shut-off nozzle on the outlet end of the hose	II, III, IV
Washing buildings, structures, sidewalks, walkways, driveways, patios, parking lots, tennis courts, or other hard-surfaced areas in a manner which results in excessive run-off	II, III, IV
Irrigation of non-permanent agriculture	II, III, IV
Use of water for street watering with trucks or for construction purposes unless no other source of water or other method can be used	II, III, IV
Use of water for decorative fountains or the filling or topping off of decorative lakes or ponds	II, III, IV
Filling or refilling of swimming pools	II, III, IV
Notes	
1. This table is based on the DWR Guidebook Table 26.	

In addition to prohibitions during water supply shortage events requiring a voluntary or mandatory program, GSWC will make available to its customers water conservation kits as required by GSWC's Rule No. 20. GSWC will notify all customers of the availability of conservation kits.

In addition to prohibitions, Rule No. 14.1 provides penalties and charges for excessive water use. The enactment of these penalties and charges is contingent on approval of Rule 14.1 implementation by the CPUC. When the rule is in effect, violators receive one verbal and one written warning after which a flow-restricting device may be installed in the violator's service for a reduction of up to 50 percent of normal flow or 6 ccf per month, whichever is greater. Table 7-5 summarizes the penalties and charges and the stage during which they take effect.

Table 7-5
Summary of Penalties and Charges for Excessive Use

Penalties or Charges	Stage When Penalty Takes Effect
Penalties for not reducing consumption	III, IV
Charges for excess use	III, IV
Flat fine; Charge per unit over allotment	III, IV
Flow restriction	III, IV
Termination of Service	III, IV
Notes	
1. This table is based on the DWR Guidebook Table 28.	

In addition to prohibitions and penalties, GSWC can use other consumption reduction methods to reduce water use up to 50 percent. Based on the requirements of the Act, Table 7-6 summarizes the methods that can be used by GSWC in order to enforce a reduction in consumption, where necessary.

Finally, GSWC has requested that the CPUC support implementation of water shortage allocation policies by amending Commission Rule 14.1 to (a) adopt specific rationing rates and restrictor valve removal fees; and (b) provide for a shortened authorization period to implement emergency measures such as mandatory conservation and rationing in order to effectively manage water shortages.

Table 7-6
Summary of Consumption Reduction Methods

Consumption Reduction Method	Stage When Method Takes Effect	Projected Reduction Percentage
Demand reduction program	All Stages	N/A
Reduce pressure in water lines; Flow restriction	III, IV	N/A
Restrict building permits; Restrict for only priority uses	II, III, IV	N/A
Use prohibitions	II, III, IV	N/A
Water shortage pricing; Per capita allotment by customer type	II, IV	N/A
Plumbing fixture replacement	All Stages	N/A
Voluntary rationing	II	N/A
Mandatory rationing	III, IV	N/A
Incentives to reduce water consumption; Excess use penalty	III, IV	N/A
Water conservation kits	All Stages	N/A
Education programs	All Stages	N/A
Percentage reduction by customer type	III, IV	N/A

Notes

1. This table is based on the DWR Guidebook Table 27.
2. N/A – Data not available at this time.

Revenue Impacts of Reduced Sales

Section 10632(g) of the Act requires an analysis of the impacts of each of the actions taken for conservation and water restriction on the revenues and expenditures of the water supplier. Because GSWC is an investor owned water utility and, as such, is regulated by the CPUC, the CPUC authorizes it to establish memorandum accounts to track expenses and revenue shortfalls caused by both mandatory rationing and voluntary conservation efforts. Utilities with CPUC-approved water management plans are authorized to implement a surcharge to recover revenue shortfalls recorded in their drought memorandum accounts. Table 7-7 provides a summary of actions with associated revenue reductions; while Table 7-8 provides a summary of actions and conditions that impact expenditures. Table 7-9 summarizes the proposed measures to overcome revenue impacts. Table 7-10 provides a summary of the proposed measures to overcome expenditure impacts.

Table 7-7
Summary of Actions and Conditions that Impact Revenue

Type	Anticipated Revenue Reduction
Reduced sales	Reduction in revenue will be based on the decline in water sales and the corresponding quantity tariff rate
Recovery of revenues with CPUC approved surcharge	Higher rates may result in further decline in water usage and further reduction in revenue
Notes	
1. This table is based on a DWR Guidebook table on page 59.	

Table 7-8
Summary of Actions and Conditions that Impact Expenditures

Category	Anticipated Cost
Increased staff cost	Salaries and benefits for new hires required to administer and implement water shortage program
Increased O&M(2) cost	Operating and maintenance costs associated with alternative sources of water supply
Increased cost of supply and treatment	Purchase and treatment costs of new water supply
Notes	
1. This table is based on a DWR Guidebook table on page 59.	
2. Operations and maintenance.	

Table 7-9
Proposed Measures to Overcome Revenue Impacts

Names of Measures	Summary of Effects
Obtain CPUC approved surcharge	Allows for recovery of revenue shortfalls brought on by water shortage program
Penalties for excessive water use	Obtain CPUC approval to use penalties to offset portion of revenue shortfall
Notes	
1. This table is based on the DWR Guidebook Table 29.	

Table 7-10
Proposed Measures to Overcome Expenditure Impacts

Names of Measures	Summary of Effects
Obtain CPUC approved surcharge	Allows for recovery of increased expenditures brought on by water shortage program
Penalties for excessive water use	Obtain CPUC approval to use penalties to offset portion of increased expenditures
Notes	
1. This table is based on the DWR Guidebook Table 30.	

Water-Use Monitoring Procedures

The Act asks for an analysis of mechanisms for determining actual reduction in water use when the Water Shortage Contingency Plan is in effect. Table 7-11 lists the possible mechanisms used by GSWC to monitor water use and the quality of data expected.

Table 7-11
Water-Use Monitoring Mechanisms

Mechanisms for Determining Actual Reductions	Type and Quality of Data Expected
Customer meter readings	Hourly/daily/monthly water consumption data for a specific user depending on frequency of readings
Production meter readings	Hourly/daily/monthly water production depending on frequency of readings; correlates to water use plus system losses
Notes	
1. This table is based on the DWR Guidebook Table 31.	

In addition to the specific actions that GSWC can undertake to verify level of conservation, GSWC can monitor long-term water use through regular bi-monthly meter readings, which gives GSWC the ability to flag exceptionally high usage for verification of water loss or abuse.

Chapter 8. Recycled Water Plan

Section 10633 details the requirements of the Recycled Water Plan to be included in the Act. The Act states the following:

Section 10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. The preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area and shall include all of the following:

- (a) A description of the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.*
- (b) A description of the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use.*
- (c) A description and quantification of the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.*
- (d) The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected pursuant to this subdivision.*
- (e) A description of actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.*
- (f) A plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use.*

Coordination

Table 8-1 summarizes the role of the agencies that participated in the development of recycled water plans that affect the Cordova System of the Golden State Water Company (GSWC).

Table 8-1
Role of Participating Agencies in the Development of the Recycled Water Plan

Participating Agencies	Role in Plan Development
Water agencies	GSWC works closely with the Sacramento Regional County Sanitation District in providing data for planning a potential recycled water distribution system and identifying potential recycled water customers. The Sacramento Regional County Sanitation District, acting as the recycled water wholesaler, would lead the way in implementing the recycled water plan and distribution network.
Wastewater agencies	The Sacramento Regional County Sanitation District provides a reliable supply of recycled water that meets California recycled water quality standards set forth in Title 22 of the California Code of Regulations.
Groundwater agencies	Not applicable for this system.
Planning agencies	The Sacramento Regional County Sanitation District, in conjunction with the affected city governments, plays a key role in conducting data and customer assessments, as well as analyzing community and economic impacts.
Notes	
1. This table is based on the DWR Guidebook Table 32.	

Wastewater Quantity, Quality, and Current Uses

Wastewater in the Cordova System is collected by gravity in a series of main, trunk, and interceptor sewers owned and operated by the Sacramento Regional County Sanitation District (SRCSD) and by the municipalities within the Sacramento metropolitan area including unincorporated areas of Sacramento County near the cities of Sacramento, Citrus Heights, and Folsom. Collected wastewater is transported to the Sacramento Regional Wastewater Treatment Plant (SRWTP) in Elk Grove.

The SRWTP provides primary and secondary treatment for an average dry weather flow (DWF) of 165 million gallons of wastewater per day (mgd). The treatment plant has a design capacity of 181 mgd and is capable of treating up to 5 mgd to meet recycled water standards. Approximately 1.5 mgd is reused for irrigation and landscape through the region; however, there are no existing recycled water uses in the Cordova System. The remaining treated wastewater (163.5 mgd) is discharged into the Sacramento River.

Because the SRWTP treats wastewater for a larger population than is accounted for in the Cordova System, an estimated per capita wastewater generation factor was used to calculate the volume of wastewater generated by the customers in the service area. The wastewater generation factor is based on the population served and the average DWF for the SRWTP. The plant serves approximately 1.3 million residents and treats an average of 165 mgd, making the average per capita wastewater generation factor for SRWTP 127 gallons per day (gpd). This per capita wastewater generation factor was used to estimate the wastewater generation in the Cordova System; Table 8-2 summarizes the estimates of existing and projected volumes of wastewater collected and treated in the service area. Of the 165 mgd

treated, SRCSD treats 1.5 mgd (1 percent) to meet recycled water quality standards; the same percentage was used to estimate the fraction of the wastewater collected in the Cordova System that is treated to meet recycled water quality standards.

Currently 163.5 mgd (99 percent) of the wastewater collected by SRCSD is discharged into the Sacramento River; the same percentage was used to estimate the fraction of the wastewater collected in the Cordova System that is discharged (refer to Table 8-3). Table 8-4 was intentionally left blank as there are no existing uses of recycled water by the GSWC customers served by the SRCSD.

Table 8-2

Estimates of Existing and Projected Wastewater Collection and Treatment in ac-ft/yr (mgd) for the Cordova System

	2000 ⁽²⁾	2005	2010	2015	2020	2025	2030
Projected population in service area	39,088	40,732	42,656	44,054	44,889	44,833	44,833
Wastewater collected & treated in service area	5,574 (5.0 mgd)	5,808 (5.2 mgd)	6,083 (5.4 mgd)	6,282 (5.6 mgd)	6,401 (5.7 mgd)	6,393 (5.7 mgd)	6,393 (5.7 mgd)
Quantity that meets recycled water standard	56	58	61	63	64	64	64

Notes

1. This table is based on the DWR Guidebook Table 33.
2. Based on actual year.
3. Values of wastewater collected and treated are estimated. For a description of the methodology, refer to the text.

Table 8-3

Estimates of Existing and Projected Disposal of Wastewater In ac-ft/yr for the Cordova System

Method of Disposal	Treatment Level	2000 ⁽²⁾	2005	2010	2015	2020	2025	2030
River discharge	Secondary	5,518	5,750	6,022	6,219	6,337	6,329	6,329

Notes

1. This table is based on the DWR Guidebook Table 34.
2. Based on actual year.
3. Volumes of effluent discharged are estimated. For a description of the methodology, refer to the text.

Table 8-4

Existing Recycled Water Use in the Cordova System

Type of Use	Treatment Level	2004 Use (ac-ft/yr)
N/A	N/A	N/A

Notes

1. This table is based on the DWR Guidebook Table 35a.

Potential and Projected Use

According to the Urban Water Management Plan for the Cordova System (2000), a survey conducted in 1994 evaluated potential water reuse throughout the county. The potential for landscape irrigation within the Cordova System was found to be 408 acre-feet per year (ac-ft/yr).

SRCSO is currently in the process of developing a Master Plan that includes Phase II of its water reuse program. Phase I was completed in 2003 when the reclamation plant at the SRWTP began operations. The SRCSD’s goal is to develop the capacity to treat up to 30 mgd to meet recycled water quality standards by the year 2020. The Cordova System is among the areas being considered to receive recycled water from the SRCSD.

Therefore, assuming that the Master Plan identifies the same potential for landscape irrigation in the Cordova System as was identified in the 1994 study, then the goal would be to actively reuse 408 ac-ft/yr in the Cordova System if and when a recycled water project is implemented. Assuming that the recycled water project is implemented by the year 2020, then this volume (408 ac-ft/yr) is considered the potential recycled water use for the Cordova System after the year 2020 (refer to Table 8-5). However, because plans to implement this alternative have not been finalized, there are no projections of recycled water use in the Cordova System at this time (refer to Table 8-6). Projections will be updated in the 2010 UWMP for the Cordova System if the SRCSD has finalized its plans. If, and when, the SRCSD decides to implement a recycled water project, where feasible, GSWC will support the project by encouraging recycled water use among its customers. Table 8-7 was intentionally left blank, because there is no projected recycled water use for 2005.

Table 8-5
Potential Future Recycled Water Uses in ac-ft/yr

Type of Use	Treatment Level	2010	2015	2020	2025	2030
Landscape	Secondary	N/A	N/A	408	408	408

Notes

1. This table is based on the DWR Guidebook Table.

Table 8-6
Projected Future Recycled Water Use in Service Area in ac-ft/yr

Type of Use	2010	2015	2020	2025	2030
N/A	N/A	N/A	N/A	N/A	N/A

Notes

1. This table is based on the DWR Guidebook Table 36.

Table 8-7
Comparison of Recycled Water Uses—Year 2000 Projections versus 2005 Actual

Type of Use	2000 Projection for 2005	2005 Actual Use
N/A	N/A	N/A

Notes
1. This table is based on the DWR Guidebook Table 37.

Optimization and Incentives for Recycled Water Use

As the owner and operator of the SRWTP, the SRCSD is responsible for determining the technical and economic feasibility of supplying recycled water to the Cordova System. Because the SRCSD is still in the initial planning stages, there are no actions in place at this time by which GSWC is encouraging the use of recycled water in the service area. Therefore, Table 8-8 is not applicable for this system and has been intentionally left blank.

However, if and when the SRCSD decides to implement a recycled water project, where feasible, GSWC will support the project by encouraging recycled water use among its customers. The plan to encourage recycled water use in the Cordova System will be updated in the 2010 UWMP for the system, pending SRCSD finalizing its plans.

Table 8-8
Methods to Encourage Recycled Water Use and the Resulting Projected Use in ac-ft/yr

Actions	2010	2015	2020	2025	2030
N/A	N/A	N/A	N/A	N/A	N/A

Notes
1. This table is based on the DWR Guidebook Table 38.

Chapter 9. Water Quality

Section 10634 of the Act requires an analysis of water quality issues and their impact to supply reliability. The Act states as follows:

Section 10634. The plan shall include information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments as described in subdivision (a) of Section 10631 and the manner in which water quality affects water management strategies and supply reliability.

GSWC Measures for Water Quality Regulation Compliance

To facilitate full compliance with water quality laws and regulations, GSWC maintains a water quality department that has independent lines of reporting authority within the organization. The water quality department is headed by a company officer specifically assigned to oversee and manage the company's water quality program. The Vice President of Water Quality has a staff of three managers, located in each of the company's regional offices. Water quality managers, in turn, manage a staff of water quality engineers and technicians that are assigned to district offices. Each district office is assigned one water quality engineer and at least one water quality technician to provide direct support to the local drinking water systems within the district.

The district water quality engineer is the main point of contact for the Department of Health Services as well as other regulatory agencies. The water quality engineer also is responsible for coordinating compliance measures through scheduling required sample collection, preparing water quality related plans, maintaining a water quality database, providing training to operations, implementing a cross connection control program, and preparing and submitting monitoring reports, permit applications and other regulatory related correspondence.

As a whole, the water quality department monitors and participates in the development of new water quality related laws and regulations. Through routine department meetings and training, the district water quality engineers are kept up to date with changing water quality regulations and related technology. These efforts contribute towards maintaining a pool of trained water quality professionals that can be utilized throughout the company. This provides the company the ability to respond to a wide variety of water quality issues or emergencies.

Current and Proposed Water Quality Regulations

Environmental Protection Agency (EPA) and the State of California have established, or will develop, the following key primary water quality regulations under the Safe Drinking Water Act (SDWA). The Current and proposed water quality regulations listed below are discussed in the following paragraphs. These regulations apply to community and non-community water systems, which includes those of Golden State Water Company (GSWC)

and may affect the GSWC water treatment facilities, treatment processes used, and monitoring requirements. See Table 9-1 for the status of current and proposed water quality regulations.

- Total Coliform Rule (TCR)
- Surface Water Treatment Rules
 - Surface Water Treatment Rule (SWTR)
 - *Cryptosporidium* Action Plan
 - Interim Enhanced SWTR (IESWTR)
 - Long Term 1 Enhanced SWTR (LT1ESWTR)
 - Long Term 2 Enhanced SWTR (LT2ESWTR)
- Disinfectant/Disinfection By-Product Rules
 - Total Trihalomethanes (TTHMs) Rule
 - Disinfectant/Disinfection By-Product (D/DBP) Rule Stage 1
 - Disinfectant/Disinfection By-Product (D/DBP) Rule Stage 2
- Volatile Organic, Synthetic Organic and Inorganic Chemical Rules
 - Volatile Organic Chemicals Rule
 - Phase IIA Fluoride Rule
 - Phase IIA Synthetic Organic Chemicals and Inorganic Chemicals Rule
 - Phase V Synthetic Organic Chemicals and Inorganic Chemicals Rule
- Groundwater Rule
- Filter Backwash Rule
- Lead and Copper Rule
- Arsenic Rule
- Radionuclide Rule
- Radon Rule
- Drinking Water Candidate Contaminant List

Safe Drinking Water Act (SDWA)

Under the federal SDWA of 1974, EPA established drinking water regulations for 23 contaminants. The SDWA Amendments of 1986 required EPA to set maximum contaminant levels (MCLs) for 83 specific constituents and to set MCLs for an additional 25 constituents every 3 years, indefinitely. The 1996 SDWA amendments retained the requirement to regulate the 83 contaminants imposed by the 1986 amendments but removed the requirement for 25 additional contaminants every 3 years and established a different process for selecting contaminants for regulation.

Under the 1996 SDWA amendments, EPA must:

- Publish a list of contaminants that may require regulation under the SDWA no later than February 6, 1998, and every 5 years thereafter
- Consult with the scientific community, including the Science Advisory Board, when preparing the list
- Provide notice and opportunity for public comment on the list

- Establish an occurrence database to be considered when EPA makes decisions to regulate contaminants that are known or anticipated to occur in public water systems
- Decide whether to regulate no fewer than five listed contaminants, no later than August 6, 2001, and every 5 years thereafter

To regulate a contaminant, EPA must find that the contaminant has an adverse effect on human health, that it occurs or is likely to occur in public water systems at a frequency and at concentrations of public health concern, and that regulation of the contaminant presents a meaningful opportunity to reduce health risks for those served by public water systems.

The status of the regulations, including the final rules and those that are still being formulated, are discussed below and summarized in Table 9-1. The current national primary drinking water standards, which are those standards related to health, are shown in Table 9-2. EPA considers compliance with secondary standards, which are those standards related to the aesthetic quality of water, to be optional; but, in California, secondary standards are mandatory unless the population served consents otherwise. The California secondary drinking water standards are shown in Table 9-3.

Primacy

EPA has delegated primary enforcement responsibility for drinking water program implementation and enforcement to the state of California. To maintain primacy (authority to enforce drinking water regulations) under the SDWA, the state must adopt drinking water regulations at least as stringent as the federal regulations and meet other relevant criteria. State drinking water regulations may be more stringent than the federal regulations, but not less stringent. In California, the California Department of Health Services (CDHS) is the primacy agency for drinking water regulations.

Table 9-1
Status of Drinking Water Regulations

Regulation	Contaminants	Status
Final Rules		
NIPDWR	18 original contaminants	Rule final 1975
Interim Radionuclides	4 additional radionuclides	Rule final 1976
Total Trihalomethanes	Sum of four trihalomethanes	Rule final 1979
Revised Fluoride	Fluoride	Rule final 1986
VOCs (Phase I)	8 VOCs	Rule final 1987
SWTR	Treatment tech. (<i>Giardia</i> and viruses)	Rule final 1989
TCR	Total coliforms, fecal coliforms, <i>E. coli</i>	Rule final 1989
Lead and Copper Rule	Lead, copper	Rule final 1991
SOCs, IOCs (Phase II)	36 IOCs, SOCs, and pesticides	MCLs final 1991
SOCs, IOCs (Phase IV)	5 IOCs, 18 SOCs	MCLs final 1992
D/DBP Rule Stage 1	Disinfectants, disinfection by-products	Rule final 1998
IESWTR	Treatment Tech. (<i>Cryptosporidium</i>)	Rule final 1998
Radionuclides	Radionuclides (other than Radon)	Rule final 2000
Arsenic ⁽¹⁾	Arsenic	Rule final 2001, new MCL of 10 µg/L effective January 23, 2006

Table 9-1
Status of Drinking Water Regulations

Regulation	Contaminants	Status
LT1ESWTR	Extends IESWTR to small utilities	Rule final 2001
Filter Backwash Rule	Regulate Filter Backwash recycle	Rule final 2001
Methyl Tertiary Butyl Ether	MTBE	Rule final 2001
Drinking Water Contaminant Candidate List ⁽¹⁾	No less than 5 Contaminants	Decision to regulate in 2001, revised DWCCCL in 2003 and every 5 years thereafter
Proposed Rules		
LT2ESWTR ⁽¹⁾	Revision of IESWTR to control <i>Cryptosporidium</i>	Proposed August 2003, missed May 2002 SDWA deadline. Final rule expected 2005
D/DBP Rule Stage 2 ⁽¹⁾	Revision of D/DBP Rule Stage 1 for distribution system monitoring	Proposed August 2003, missed May 2002 SDWA deadline. Final rule expected 2005
Groundwater Rule ⁽¹⁾	Virus, groundwater disinfection	Proposed May 2000, missed May 2002 SDWA deadline. Final rule expected 2005
Future Rules		
Radon ⁽¹⁾	Radon	Proposed November 1999, EPA has not indicated a final schedule for promulgation
TCR Revisions ⁽¹⁾	Distribution System Issues	Potentially proposed mid-2006, final rule by 2008
Notes		
1. Regulation with potential future impact to GSWC.		

Table 9-2
Current Federal Drinking Water Standards

Parameter	mg/L (except as noted)
Inorganic Contaminants	
	MCL
Antimony	0.006
Arsenic ⁽¹⁾	0.05
Asbestos	7 x 10 ⁶ Fibers/L
Barium	2
Beryllium	0.004
Bromate	0.010
Cadmium	0.005
Chlorite	0.8
Chromium	0.1
Cyanide	0.2
Fluoride	4
Mercury	0.002
Nickel	0.1
Nitrate (as N)	10

Table 9-2
Current Federal Drinking Water Standards

Parameter	mg/L (except as noted)
Nitrite (as N)	1
Nitrate plus Nitrite (both as N)	10
Selenium	0.05
Thallium	0.002
Inorganic Contaminants	Treatment Technique
Copper	1.3 (Action Level)
Lead	0.015 (Action Level)
Organic Contaminants	MCL
Alachlor	0.002
Benzene	0.005
Benzo (a) pyrene	0.0002
Carbon Tetrachloride	0.005
Carbonfuran	0.04
Chlordane	0.002
2,4-D	0.07
Dalapon	0.2
Di (2-ethylhexyl) adipate	0.4
Di (2-ethylhexyl) phthalate	0.006
1,2-Dibromo-3-chloropropane (DBCP)	0.0002
p-Dichlorobenzene	0.075
o-Dichlorobenzene	0.6
1,2-Dichloroethane	0.005
1,1-Dichloroethylene	0.007
cis-1,2-Dichloroethylene	0.07
trans-1,2-Dichloroethylene	0.1
Dichloromethane	0.005
1,2-Dichloropropane	0.005
Dinoseb	0.007
Diquat	0.02
Endothall	0.1
Endrin ^h	0.002
Ethylbenzene	0.7
Ethylene Dibromide	0.00005
Glyphosate	0.7
Haloacetic Acids (sum of 5 [HAA%])	0.060
Heptachlor	0.0004
Heptachlor epoxide	0.0002
Hexachlorobenzene	0.001
Hexachlorocyclopentadiene	0.05
Lindane	0.0002

Table 9-2
Current Federal Drinking Water Standards

Parameter	mg/L (except as noted)
Methoxychlor	0.04
Monochlorobenzene	0.1
Oxamyl (vydate)	0.2
Pentachlorophenol	0.001
Picloram	0.5
Polychlorinated biphenyls (PCBs)	0.0005
Simazine	0.004
Styrene	0.1
2,3,7,8-TCDD (dioxin)	5×10^{-8}
Tetrachloroethylene	0.005
Toluene	1
Toxaphene (revised) ^f	0.003
2,4,5-TP (silvex)	0.05
1,2,4-Trichlorobenzene	0.07
1,1,1-Trichloroethane	0.20
1,1,2-Trichloroethane	0.005
Trichloroethylene	0.005
Trihalomethanes (sum of 4 [TTHM])	0.080
Vinyl Chloride	0.002
Xylenes (total)	10
Organic Contaminants	Treatment Technique
Acrylamide	Restrictions in polymer use
Epichlorohydrin	Restrictions in material use
Microorganisms	Standard
<i>Cryptosporidium</i>	Treatment Tech (99% removal/inactivation)
<i>Escherichia coli</i>	Treatment Tech (0 cfu/100 mL)
Fecal Coliforms	Treatment Technique (0 cfu/100 mL)
<i>Giardia lamblia</i>	Treatment Tech (99.9% removal/inactivation)
Heterotrophic Bacteria	Treatment Tech (500 cfu/mL at end of distribution system or measurable chlorine residual)
<i>Legionella</i>	Treatment Tech
Total Coliforms	5% (presence/absence)
Turbidity	Performance Std (0.3 NTU, 95%)
Viruses	Treatment Tech (99.99% removal/inactivation)
Radionuclides	MCL
Beta-particle and photon emitters	4 mrem
Alpha emitters	15 pCi/L
Radium 226 + 228	5 pCi/L
Uranium	0.030
Notes	
1. Arsenic has been proposed at 10 µg/L in the new rule that is currently being reviewed.	

Table 9-3
Current State Secondary Drinking Water Regulations

Parameter	mg/L (except as noted)		
Contaminants	SMCL or SMCL Ranges		
Aluminum	0.2		
Color	15 Color Units		
Copper	1.0		
Corrosivity	Noncorrosive		
Foaming Agents (MBAs)	0.5		
Iron	0.3		
Manganese	0.05		
Methyl tertiary butyl ether (MTBE)	0.005		
Odor	3 Threshold Odor Number		
Silver	0.1		
Thiobencarb (Bolero)	0.001		
Turbidity	5 units		
Zinc	5		
	Recommended	Upper	Short Term
Total Dissolved Solids	500	1,000	1,500
Specific Conductance, micromhos	900	1,600	2,200
Chloride	250	500	600
Sulfate	250	500	600

Total Coliform Rule (TCR)

The TCR is the latest version of one of the oldest drinking water regulations. Coliform bacteria are organisms that have one or more biochemical reactions similar to *Escherichia coli* (*E. coli*). *E. coli* are bacteria that are commonly found in the digestive tract of warm-blooded animals. The total coliform test, then, is a test for bacteria, with similar biochemistry to *E. coli*, but which are capable of growing at 35 degrees Celsius (°C). The total coliform group includes several genera of bacteria belonging to the family Enterobacteriaceae. Some of these bacteria are not pathogenic. Total coliform testing is commonly used in drinking water treatment to determine the effectiveness of source water, treatment, and distribution system barriers to bacterial contamination.

The TCR was promulgated by the EPA in 1989 and DHS enacted its companion TCR that became effective on June 30, 1992. The TCR changed the basic principle of regulating bacterial quality. Instead of having an MCL based on average concentrations, total coliforms are now regulated based on presence/absence. For systems that collect 40 or more samples per month (more than 33,000 population) to be in compliance, no more than 5 percent of the samples taken for coliforms in a month can be coliform positive. A sample is considered positive if 1 of the 10 tubes is positive.

Other significant provisions of the TCR are:

- In the event of a coliform-positive sample, the utility must resample that location as well as the nearest upstream and downstream services for coliforms the following day and continue to analyze on consecutive days until either all three samples are negative, or the TCR is violated.
- Coliform-positive samples must be further examined for the presence of fecal coliforms or *E. coli*.
- If two consecutive samples from the same sample point are positive and one of those samples is positive for fecal coliforms, the system is out of compliance for that month.

All distribution system zones must be included in the routine sampling program, and some of the sample locations must be rotated throughout the year.

TCR Potential Revisions and Distribution System Requirements

The 1996 amendments to the SDWA require EPA to review and revise, as appropriate, each national primary drinking water regulation at least every 6 years. EPA published as part of its National Primary Drinking Water Regulation (NPDWR) Review its decision to revise the TCR in July, 2003.

EPA is in the process of reviewing available data and research on distribution system risks. These efforts will result in the review and possible revision of the TCR, as well as the potential for requirements for finished water quality in the distribution system. The potential rule revisions could be proposed in 2006 with the rule final by 2008.

EPA has been working with distribution system experts to compile existing information regarding potential health risks that may be associated with distribution systems in "white papers" on the following nine distribution system issues:

- Intrusion
- Cross-connection control
- Aging infrastructure and corrosion
- Permeation and leaching
- Nitrification
- Biofilms/growth
- Covered storage
- Decay in water quality over time
- New or repaired watermains

EPA is also involved in the development of a series of ten TCR issue papers on the following issues:

- Distribution system indicators of water quality
- The effectiveness of disinfectant residuals in the distribution system
- Analysis of compliance and characterization of violations of the TCR
- Evaluating HACCP strategies for distribution system monitoring, hazard assessment and control
- Inorganic contaminant accumulation in distribution systems

- Distribution system inventory and condition assessment
- Optimization of distribution system monitoring strategies
- Effect of treatment on nutrient availability
- Causes of Total Coliform positive samples and contamination events in distribution systems
- Total Coliform sample invalidation

Distribution system white papers and TCR issue papers are intended to inform EPA and stakeholders of areas of potential TCR revisions and distribution system requirements.

Surface Water Treatment Rules

A series of rules has been or is currently being developed to provide control of microbial contaminants from surface water or groundwater that is under the direct influence of surface water.

The Surface Water Treatment Rule (SWTR)

The SWTR is primarily a microbiological regulation and codified the use of the multiple barrier concept for control of pathogenic organisms. The SWTR became effective in June 1993, and required all but the most pristine water sources to provide filtration of their surface water (or groundwater under the direct influence of surface water). It also required all systems having a surface water source to provide some level of disinfection.

In further defining the physical barrier of filtration, the SWTR reduced the MCL for finished water turbidity from 1 NTU to 0.5 NTUs (95 percent of the monthly samples, measured daily), and set a limit of 5 NTUs on the maximum finished water turbidity.

For disinfection, the SWTR required 99.9 percent (3-log) for the combination of removal and inactivation of *Giardia* cysts and 99.99 percent (4-log) for the combination of removal and inactivation of enteric viruses. The SWTR gave credit for 99.7 percent (2½-log) removal of *Giardia* cysts and 99 percent (2-log) removal of viruses in a “well-operated” conventional surface water treatment plant. The SWTR, then, required an additional ½-log of inactivation of *Giardia* cysts and an additional 2-log of inactivation of viruses. Credit for the inactivation (or disinfection) requirements for *Giardia* and viruses was given for chlorine, chloramines, ozone, and chlorine dioxide. The credit was based upon achieving the product of disinfectant concentration and contact time, known as CT. The concentration (C) used was normally the concentration exiting the reactor used for primary disinfection and the time (T) was the time it took for 10 percent of the influent flow to exit the reactor (T₁₀). T₁₀ was to be determined using tracer testing in the plants using different flow rates. Tables of CT required for each of the disinfectants at different temperatures, and in some cases, different pH values were published in the *Guidance Manual for Compliance with the Filtration and Disinfection Requirements for Public Water Systems Using Surface Water Sources* (American Water Works Association, Denver, CO, 1991).

As an additional barrier to organisms, the SWTR required that a measurable disinfectant residual be present or heterotrophic plate counts be less than 500 colony-forming units at the farthest ends of the distribution system. The measurable residual was defined as a minimum of 0.2 mg/L of free or combined chlorine.

Cryptosporidium Action Plan

In April 1995, the California DHS adopted a *Cryptosporidium* Action Plan that is intended to facilitate comprehensive compliance with the SWTR. The plan does not include any requirements beyond the existing regulations but, instead, clarifies the existing requirements to optimize the treatment process and reduce the risk of a waterborne illness outbreak. The plan includes six elements:

1. Conduct watershed sanitary surveys
2. Submission of available data to CDHS
3. Review of alternative technologies
4. Prepare operations plan/optimized treatment
5. Prepare reliable removal treatment processes
6. Inform the public

The plan acknowledges that seasonal raw water turbidity and coliform data are a necessary part of any watershed sanitary survey. If cattle, sheep, or other livestock are allowed on a watershed, the survey must identify their location and number as well as steps that are taken to prevent contamination from the animal waste. Measures that will prevent runoff from any animal containment site reaching the water source should also be identified.

As part of the plan, the DHS completed a comprehensive review of the operations by water systems that use an alternative treatment system. The review focused on compliance with the turbidity standard during normal operations and after backwashing or other interruptions in service. It also included a review of the engineering report required 60 days after the first year of operation.

The *Cryptosporidium* Action Plan states that DHS “agrees with and endorses” the American Water Works Association (AWWA) goal of 0.1 NTU for effluent turbidity from all surface water treatment plants. The plan recommends that all water systems with a surface water supply “adopt a philosophy of always optimizing their surface water treatment plant operations in a manner designed to achieve the maximum turbidity removal.” CDHS believes that, by striving to meet these goals, water systems will be minimizing their customers’ risk of exposure to pathogens, including *Cryptosporidium*. The plan identifies the following elements that should be included in the operations plan of a system for treatment optimization:

- Including a statement at the beginning of the operations plan stating that it is the goal of the water utility to optimize plant performance and maximize turbidity removal.
- Monitoring all unit processes closely and responding immediately to any malfunction.
- Operating unit processes at hydraulic loading rates to meet optimization goals.
- Establishing procedures to optimize coagulation, flocculation, and sedimentation to enable maximum turbidity removal in the pretreatment units with a turbidity goal of 1 to 2 NTUs in the sedimentation basin effluent at all times. The proper pretreatment chemical and dose should be determined from results of jar tests or particle counters.

- Expanding turbidity monitoring of individual filters on both a continuous basis and intermittent grab samples and, if possible, turbidity monitoring of all sedimentation processes.
- Calibrating turbidimeters frequently.
- Establishing procedures for optimizing filter operations to avoid turbidity spikes after service interruptions and attempting to achieve turbidity values of 0.3 NTU or less after backwash.
- Operating the plant to avoid sudden increases in flow through a filter.
- Optimizing the performance of backwash water recovery systems. Establishing a goal of less than 2.0 NTUs for the reclaimed backwash water and sludge reclamation system effluent.

The *Cryptosporidium* Action Plan states that all water treatment plants should install a continuous turbidity analyzer and chart recorder to monitor the plant effluent. The monitor should be inspected and standardized regularly. Additionally, all water utility systems should be capable of quickly replacing or repairing failed equipment including:

- Filter media and filter underdrains
- Backwash pumps and surface wash systems
- Pretreatment chemical feed and mixing facilities
- Turbidity monitoring units

Finally, the CDHS suggests that water utilities should provide an informational notification to its customers if they do not have a treatment process in place that provides for physical removal of pathogens. Those plants that are hydraulically overloaded or unable to achieve the effluent turbidity goals until improvements are made may also inform the customers of the system.

Interim Enhanced Surface Water Treatment Rule

The two main purposes of the IESWTR are to improve control of microbial pathogens in drinking water, particularly for the protozoan, *Cryptosporidium*, and to guard against significant increases in microbial risk that might otherwise occur when systems implement the Stage 1 D/Disinfectant By-Product (DBP) Rule (discussed below). The IESWTR was finalized in December 1998, but enforcement began in 2002.

Because of the resistance of *Cryptosporidium* oocysts to inactivation by chlorine and chloramine and a lack of data concerning other disinfectants, the IESWTR concentrated its efforts on improving the physical barrier (filtration). This was done by further reducing the MCL for finished water turbidity from 0.5 NTU to 0.3 NTU and the maximum single sample finished water turbidity limit was reduced to 1 NTU. A facility is deemed to be in compliance with the MCL if 95 percent of the daily values per month are at or below 0.3 NTU. Since the limit is 0.3 NTU and not 0.30 NTU, the plant is in compliance as long as the values stay at or below 0.34 NTU. Additionally, individual filter monitoring was required and exception reports to the state are required for:

- Any individual filter with a turbidity level greater than 1.0 NTU based on two consecutive measurements 15 minutes apart, and
- Any individual filter with a turbidity greater than 0.5 NTU at the end of the first 4 hours of filter operation based on the two consecutive measurements 15 minutes apart

Also, if an individual filter turbidity level is greater than 1.0 NTU, based on two consecutive measurements 15 minutes apart at any time in each of 3 consecutive months, the system must provide an exceptions report (within 30 days of the exceedance) and conduct a self-assessment of the filter (according to the EPA guidance for Comprehensive Performance Evaluation). And, if an individual filter has turbidity greater than 2.0 NTU, based on two consecutive measurements 15 minutes apart at any time in each of 2 consecutive months, the system must provide an exceptions report (within 30 days of the exceedance) and arrange for a Comprehensive Performance Evaluation (CPE) by the state or a third party approved by the state.

To guard against an increase in microbial risk due to implementation of the DBP Rule, disinfectant profiling and benchmarking are required. Systems having total trihalomethane (TTHM) concentrations exceeding 0.064 mg/L or total haloacetic acid (HAA5) concentrations exceeding 0.048 mg/L are required to produce disinfectant profiles for 3 years of existing data showing the CT that was actually achieved, divided by the CT required for inactivation of *Giardia* and viruses. If the data do not exist, the system was required to collect 1 year of data by March 16, 2000. The data were analyzed; and the month having the lowest ratio of CT to CT required became the “critical period,” and the average value of the ratio became the “benchmark.” Systems have to consult with the state before changing disinfection practices, which could result in a log inactivation less than the benchmark value.

Long Term 1 Enhanced Surface Water Treatment Rule

The LT1ESWTR extends the IESWTR to systems serving fewer than 10,000 people.

Long Term 2 Enhanced Surface Water Treatment Rule

The LT2ESWTR is also designed to control risk from *Cryptosporidium*. An Agreement in Principle was reached by the Federal Advisory Committee for this rule and the Disinfectant/Disinfection By-Product Rule Stage 2 (discussed below) in August 2003. In this Agreement, the major microbial issues were addressed as follows:

- **Monitoring for Bin Classification.** A two year monitoring program is required for systems serving 10,000 or more people for *Cryptosporidium*, *E. coli*, and turbidity. The water system will be classified into a bin for *Cryptosporidium* risk based upon this monitoring.
- **Action Bins.** Table 9-4 illustrates the bin classification system for *Cryptosporidium* risk.
- **Toolbox.** A toolbox approach was recommended that would receive log-credit given in Table 9-5.
- **Reassessment and Future Monitoring.** Systems that provide a total of 2.5-log of treatment (99.7 percent) for *Cryptosporidium* in addition to conventional treatment are

exempt from reassessment and future monitoring. Six years after initial bin characterization, another round of monitoring will be held.

- **Unfiltered Systems.** Unfiltered systems must continue to meet filtration avoidance criteria, provide 4-log virus inactivation, 3-log *Giardia* inactivation, and 2-log *Cryptosporidium* inactivation.

Table 9-4

Bin Requirements Table (from Microbial/Disinfection Byproducts [M/DBP] Federal Advisory Committee Stage 2 M-DBP Agreement in Principle)

Bin Number	Average <i>Cryptosporidium</i> Concentration	Additional treatment requirements for systems with conventional treatment that are in full compliance with the IESWTR
1	<i>Cryptosporidium</i> <0.075/L	No Action
2	$0.075/L \leq \textit{Cryptosporidium} < 1.0/L$	1-log treatment (systems may use any technology or combination of technologies from toolbox as long as total credit is at least 1-log)
3	$1.0/L \leq \textit{Cryptosporidium} < 3.0/L$	2.0-log treatment (systems must achieve at least 1-log of the required 2-log treatment using ozone, chlorine dioxide, UV, membranes, bag/cartridge filters, or in-bank filtration)
4	<i>Cryptosporidium</i> $\geq 3.0/L$	2.0-log treatment (systems must achieve at least 1-log of the required 2.5-log treatment using ozone, chlorine dioxide, UV, membranes, bag/cartridge filters, or in-bank filtration)

Disinfectant/Disinfection By-Product Rules

Total Trihalomethanes (TTHM) Rule

The TTHM Rule was the first rule to recognize that a risk of cancer may be connected to the use of chlorine to inactivate pathogenic organisms. The TTHM Rule was effective in 1981.

Chlorine reacts with naturally occurring organic matter (NOM) present in water to form chlorinated organic compounds. Four of these – chloroform, dichlorobromo-methane, dibromochloromethane, and bromoform – were selected to serve as indicators for the cancer risk due to chlorinated disinfection by-products. The MCL for the total of these four compounds was set at 0.1 mg/L. This historic rule changed the manner in which many water plants in the U.S. performed disinfection. Prior to the rule, chlorine was added liberally to raw water to improve plant operations which maximized contact time available through the treatment plant. After this rule took effect, many utilities changed to applying chlorine after much of the NOM had been removed through coagulation, flocculation, and sedimentation. Also, the use of chloramines, which limit the formation of trihalomethanes, was increased as a disinfectant for the distribution system.

Table 9-5
 Microbial Toolbox Components (from Microbial/Disinfection Byproducts [M/DBP] Federal Advisory Committee Stage 2 M-DBP Agreement in Principle)

APPROACH	Potential Log Credit			
	0.5	1	2	>2.5
Watershed Control				
Watershed Control Program ⁽¹⁾	X			
Reduction in oocyst concentration ⁽³⁾			As Measured	
Reduction in viable oocyst concentration ⁽³⁾			As Measured	
Alternative Source				
Intake Relocation ⁽³⁾			As Measured	
Change to Alternative Source of Supply ⁽³⁾			As Measured	
Mgmt. of Intake to Reduce Capture of Oocysts in Source Water ⁽³⁾			As Measured	
Managing Timing of Withdrawal ⁽³⁾			As Measured	
Managing Timing of Withdrawal in Water Column ⁽³⁾			As Measured	
Pretreatment				
Off-Stream Raw Water Storage w/Detention ~ X days ⁽¹⁾	X			
Off-Stream Raw Water Storage w/Detention ~ Y weeks ⁽¹⁾		X		
Presettling Basin w/Coagulant ⁽¹⁾	X	-->		
Lime Softening ⁽¹⁾	----->			
In-Bank Filtration ⁽¹⁾		X	----->	
Improved Treatment				
Lower Finished Water Turbidity (0.15 NTU 95%tile Combined Filter Effluent)	X			
Slow Sand Filters ⁽¹⁾				X
Roughing Filters ⁽¹⁾	X	----->		
Membranes (MF, UF, NF, RO) ⁽¹⁾				X
Bag Filters ⁽¹⁾		X	----->	
Cartridge Filters ⁽¹⁾			X	
Improved Disinfection				
Chlorine Dioxide ⁽²⁾	X	X		
Ozone ⁽²⁾	X	X	X	
UV ⁽²⁾				X
Peer Review/Other Demo./Validation or System Performance				
Peer Review Program (ex. Partnership Phase IV)		X		
Performance Studies demonstrating reliable specific log removals for technologies not listed above. This provision does not supersede other inactivation requirements.			As demonstrated	

Notes

X indicates potential log credit based on proper design and implementation in accordance with EPA guidance. Arrow indicates estimation of potential log credit based on site-specific or technology-specific demonstration of performance.

1. Criteria to be specified in guidance to determine allowed credit.
2. Inactivation dependent on dose and source water characteristics.
3. Additional monitoring for *Cryptosporidium* after this action would determine new bin classification and whether additional treatment is required.

Disinfectant/Disinfection By-Product (D/DBP) Rule Stage 1

Stage 1 of the D/DBP Rule was enacted to reduce the health risk due to disinfection practice. To accomplish this, the Rule reduced the MCL for TTHM, enacted MCLs for haloacetic acids (HAA5) (Table 9-6), bromate (an ozone by-product), and chlorite (a chlorine dioxide by-product), enacted maximum residual disinfectant levels (MRDLs) for chlorine, chloramines, and chlorine dioxide (Table 9-7), and enacted a treatment technique called “enhanced coagulation” (EC) to limit the amount of unknown by-products that may be formed during chlorination.

Table 9-6
Disinfection By-Product MCLs from Stage 1 of the D/DBP Rule

Compound or Group	MCL, mg/L
Trihalomethanes (TTHM)	0.08
Haloacetic Acids (HAA5)	0.06
Bromate	0.01
Chlorite	1.0

Table 9-7
Disinfectant MRDLs from Stage 1 of the D/DBP Rule

Compound or Group	MCL, mg/L
Chlorine	4.0
Chloramines	4.0
Chlorine Dioxide	0.8

EC defines a requirement for removal of total organic carbon (TOC) in the coagulation, flocculation, sedimentation portion of the conventional treatment plant. A system does not have to implement enhanced coagulation if any of the following are true:

1. Source water TOC is less than 2.0 mg/L.
2. Treated water TOC is less than 2.0 mg/L.
3. Source water TOC < 4.0 mg/L, raw water alkalinity > 60 mg/L as CaCO₃, distribution system TTHM and HAA5 concentrations are less than or equal to 40 mg/L and 30 mg/L, respectively.
4. Distribution system TTHM and HAA5 concentrations are less than or equal to 40 mg/L and 30 mg/L, respectively, and the system uses only free chlorine for disinfection.
5. Source-water-specific ultraviolet absorbance (SUVA) is less than 2.0 L/mg-m. SUVA is calculated by dividing UV absorbance (m⁻¹) at 254 nm by the concentration (mg/L) of dissolved organic carbon (DOC).

6. Treated water SUVA is less than 2.0 L/mg-m.

If none of these conditions are met, Step 1 of EC takes effect. Step 1 establishes targets for additional precursor removals to be achieved based on raw water TOC and alkalinity. These targets are shown in Table 9-8. If a utility can satisfy the TOC percent removals specified in Step 1, the EC criterion for Stage 1 is satisfied.

Table 9-8
Required Removal of TOC by Enhanced Coagulation, Step 1

Source Water TOC mg/L	Source Water Alkalinity , mg/L as CaCO ₃		
	0 to 60	>60 to 120	>120
>2.0 to 4.0	35	25	15
>4.0 to 8.0	45	35	25
>8.0	50	40	30

If a system is unable to meet the Step 1 TOC removal requirements, an alternative percent TOC removal requirement may be selected by Step 2 procedures as follows:

1. Bench or pilot tests are performed in which alum or an equivalent dose of ferric coagulant is added in 10 mg/L increments until the pH is lowered to the target pH value. The target pH values are given in Table 9-9 for varying source water alkalinity.
2. Once the bench or pilot test is complete, the TOC removal (mg/L) is then plotted versus coagulant dose (mg/L).
3. The alternative TOC removal percentage is set at the point on the TOC versus coagulant dose plot where the slope changes from greater than 0.3 mg TOC/L / 10 mg alum/L to less than 0.3/10 and remains less than 0.3/10.

If the TOC removal versus coagulant dose plot does not reach this point of diminishing returns, the water is considered not amenable to enhanced coagulation; and a waiver from the enhanced coagulation requirements must be obtained from the state.

Table 9-9
Target pH Values for Enhanced Coagulation, Step 2 Bench Testing

Raw Water Alkalinity, mg/L as CaCO ₃	Target pH
0 to <60	5.5
60 to <120	6.3
120 to <240	7.0
240	7.5

D/DBP Rule Stage 2

Stage 2 of the D/DBP Rule is designed to reduce DBP occurrence peaks in the distribution system. An Agreement in Principle was reached by the Federal Advisory Committee for this rule and the Long Term 2 Enhanced Surface Water Treatment Rule (discussed above) in August 2003. This rule is expected to be finalized in 2005. In this Agreement, the major DBP issues were addressed as follows:

- Compliance monitoring will be preceded by an initial distribution system monitoring study to select optimal sampling points for capturing peaks.
- Compliance with each MCL (TTHM and HAA5) will be determined based upon a Locational Running Annual Average (a running annual average calculated at each sample location).
- Systems will comply with the Stage 2 D/DBP Rule in two phases – 3 years after promulgation all systems must comply with a 120 µg/L TTHM / 100 µg/L HAA5 locational running annual average based on Stage 1 monitoring sites and continue to comply with the 80 µg/L TTHM / 60 µg/L HAA5 system running annual average from Stage 1.
- Six years after rule promulgation (with an additional 2-year extension available for systems requiring capital improvements) large and medium systems must comply with an 80 µg/L TTHM / 60 µg/L HAA5 based upon the new sample sites identified in the initial distribution system monitoring described above.
- Small systems must comply with the 80 µg/L TTHM / 60 µg/L HAA5 locational running annual average in either 7.5 or 8.5 years (with an additional 2-year extension available for systems requiring capital improvements) depending upon whether the system is required to do *Cryptosporidium* monitoring as part of the LT2ESWTR.
- The bromate MCL will remain at 0.010 mg/L. EPA commits to review the bromate MCL as part of the 6-year review to determine whether the bromate MCL should be reduced to 0.005 mg/L or a lower concentration.

Volatile Organic, Synthetic Organic and Inorganic Chemical Rules

Volatile Organic Chemicals Rule

The Phase I Volatile Organic Chemicals (VOCs) Rule established MCLGs and MCLs for eight VOCs. The rule was promulgated in July 1987 and became effective in January 1989. All public water systems (PWS) were required to complete initial VOC monitoring by December 1991. Monitoring requirements include sampling at each entry point to the distribution system. If no VOCs were detected during the initial monitoring, repeat monitoring is required every three to five years, depending on the vulnerability of the source. If VOCs are detected, quarterly samples must be analyzed. Compliance requires that VOC levels be lower than the MCLs, based on the annual average of quarterly samples.

The Phase I VOC Rule also required monitoring of 51 additional unregulated VOCs. All systems were required to complete the initial monitoring for these contaminants by December 1991. Repeat monitoring is required every five years; however, USEPA revises

the list of unregulated contaminants thereby changing the constituents to be monitored. Monitoring requirements for Phase I contaminants were revised in the Phase II Synthetic Organic Chemicals and Inorganic Chemicals Rule (Phase II SOC/IOC Rule) to conform with the standardized monitoring.

Phase IIA Fluoride Rule

The Phase IIA Fluoride Rule applies to all public water systems. The rule was finalized in April 1986 and became effective in October 1987. The primary purpose of the Phase IIA Fluoride Rule was to protect the public from crippling skeletal fluorosis. The rule established an MCLG and MCL for fluoride at 4 mg/L. A secondary contaminant level (SMCL) of 2 mg/L was established to protect against dental fluorosis. Monitoring of fluoride concentration is required yearly for surface water sources and every three years for groundwater sources. For systems practicing fluoridation, daily monitoring of fluoride at the entrance to the distribution system is recommended.

Phase II Synthetic Organic Chemicals and Inorganic Chemicals Rule

The Phase II SOC/IOC Rule applies to all public water systems. The rule was promulgated in June 1991 (33 contaminants) and July 1991 (5 contaminants). This rule established MCLs and treatment techniques for 38 contaminants. Monitoring for the Phase II contaminants occurs in a standardized 3 year cycle, which began in January 1993. Compliance with the Phase II MCLs is based on the average of quarterly samples.

Phase V Synthetic Organic Chemicals and Inorganic Chemicals Rule

The Phase V Rule was promulgated in July 1992 and set MCLGs and MCLs for 23 contaminants. Compliance monitoring for these contaminants follows the same standardized monitoring framework introduced with the Phase II rule. Some of the Phase V contaminants were previously on the unregulated contaminants monitoring (UCM) lists under other rules. To eliminate duplication, these contaminants were withdrawn from the UCM lists.

Groundwater Rule

The EPA is currently in the process of developing the Groundwater Rule (GWR), formerly known as the Groundwater Disinfection Rule. The rule name was changed to reflect a more holistic regulatory approach to addressing ground water issues. The rule applies to public ground water systems and to systems that mix surface water and ground water if the ground water is added directly to the distribution system and provided to consumers without treatment. This includes untreated stand-alone ground water wells and untreated ground water plants that have their own entry points to the distribution system as well as untreated groundwater blended with treated surface water prior to the entry point to the distribution system. Treatment in this case is defined as 4-log inactivation/removal of viruses.

The proposed Groundwater Rule was published in the Federal Register on May 10, 2000. The final rule is expected in late 2005. Specific requirements proposed in the rule include:

1. System sanitary surveys conducted by the state and identification of significant deficiencies.

2. Hydrogeologic sensitivity assessments for undisinfected systems.
3. Source water microbial monitoring by systems that do not disinfect and draw from hydrogeologically sensitive aquifers or have detected fecal indicators within the system's distribution system.
4. Corrective action by any system with significant deficiencies or positive microbial samples indicating fecal contamination.
5. Compliance monitoring for systems which disinfect to ensure that they reliably achieve 4-log inactivation or removal of viruses.

EPA missed the May 2002 deadline to promulgate, and the final rule was expected in early 2005, but was withdrawn for further review. The schedule for the release of the final GWR is uncertain at this time.

Filter Backwash Rule

The Filter Backwash Rule is a regulation for filtered surface water supplies that recycle some or all of filter backwash into the plant. The purpose of the rule is to require systems to review their recycle practices and, where appropriate, work with the State to make any necessary changes to current practices that may compromise microbial control. The proposed rule was published in April 2000, with the final rule promulgated in April 2001. It will apply to all systems that use filter recycle streams. The final rule contained the following key provisions:

1. Return of all recycle flows prior to the point of the primary coagulant addition.
2. Direct filtration plants to provide information to the state on their current recycle practice.
3. A requirement for systems meeting criteria to perform a one-time self assessment of their recycle practice and consult with their primacy agency to address and correct high risk recycle operations.

The first element would require that all systems using surface water or groundwater under the direct influence of surface water return all recycle flows to the process prior to the point of the primary coagulant addition. Waivers to this requirement would be available from state primacy agencies for unique treatment conditions.

The second element would require all direct filtration plants to report to the state primacy agency whether flow equalization or treatment is provided for recycle flow prior to its return to the treatment process. The state would use that information to determine the plants that need to change their current recycle practice in order to provide additional public health protection.

The third element would require that all plants using 20 or fewer filters and directly recycling flows to the treatment process without any form of treatment on the recycle flow complete a self-assessment. The self-assessment would be used to determine the effect of untreated recycle flows to the plant process. The State primacy agency would use the results of the self-assessment to determine the appropriate level of treatment of recycle flows.

Systems were to notify the State of their recycle practices by October 2003, modify their recycle return location as required by June 2004, and complete the necessary capital improvements to comply with all rule requirements by June 2006.

Lead and Copper Rule

The Lead and Copper Rule was promulgated in June 1991 and went into effect in December 1992, with minor revisions released in April 2000. The rule applies to all community and non-transient non-community water systems. The rule developed MCLGs and action levels for both lead and copper in drinking water. The major difference between this regulation and most others is that the water is to be monitored at the customer's tap, not the treatment plant discharge point. Lead and copper must be monitored at the customer's taps every 6 months and twice each calendar year at the highest risk locations. The highest risk locations are defined as:

- Piping with lead solder installed after 1982,
- Lead water service lines,
- Lead interior piping.

For compliance, the samples at the customer's tap must not exceed the following action levels:

- Lead concentration of 0.015 mg/L detected in the 90th percentile of all samples.
- Copper concentration of 1.3 mg/L detected in the 90th percentile of all samples.

If action levels are exceeded, water systems must collect source water samples and submit all data to the state with a treatment recommendation to reduce concentrations below the action level. In addition, the water system must also provide a public education program to its customers within 60 days of the action level exceedance. The education program must be continued until the samples are found to be below the lead action levels.

All water systems that exceed the lead or copper action levels are also required to conduct a corrosion control study. Corrosion control studies must compare the effectiveness of pH and alkalinity adjustment, calcium adjustment, and addition of a phosphate or silica-based corrosion inhibitor. Large and medium systems are also required to monitor many other water quality parameters at the plant discharge and customer's tap.

After a corrosion control study is completed, a water system must develop a corrosion control program and submit it for approval to the primacy agency. Once approval of the plans is received, water systems have 24 months to install and implement the treatment methods for corrosion control and 12 additional months to collect follow-up samples. After this time, the water system must comply with the action levels for both lead and copper.

In 2000, minor revisions to the lead and copper rule were promulgated to streamline requirements and reduce some burdens on water systems. No changes to the MCLs or the MCLGs were made. Small changes were made to reduce the frequency of monitoring for systems with low lead and copper tap levels and to update the analytical methods used for compliance. Further revisions to the lead and copper rule are expected to be proposed in late 2005, but no information as to what will be included in the potential revisions to the rule has been released.

Arsenic Rule

The original arsenic MCL of 50 µg/L was set by the EPA in 1975 based on Public Health Service Standard originally published in 1942. A new proposed Arsenic Rule was released in June 2000. The EPA was originally under a court-imposed deadline to promulgate this rule by November 1992. However, the EPA has received extensions to examine health effects and occurrence data. EPA succeeded in finalizing the Arsenic Rule on January 16, 2001, during the final days of the Clinton administration. The final rule was published in the Federal Register on January 22, 2001 and became effective on February 22, 2002.

The following is a summary of the major provisions and requirements of the rule:

- A MCLG for arsenic in drinking water is set at zero.
- The MCL for arsenic is revised from 50 µg/L down to 10 µg/L by January 23, 2006.
- Beginning with Consumer Confidence Reports (CCRs) due by July 1, 2002, all community water systems (CWSs) will begin providing health information and arsenic concentrations in the annual reports for water that exceeds 5 µg/L (one half of the MCL).
- Both CWSs and non-transient non-community water systems (NTNCWSs) are required to meet the revised arsenic standard.
- Two compliance requirements for inorganic contaminants (IOCs), volatile organic contaminants (VOCs), and synthetic organic contaminants (SOCs). Specifically, when a system fails to collect the required number of samples, compliance averages will be based on the actual number of samples collected. Also, new public water systems and systems using new sources of water must demonstrate compliance within state-specified time and sampling frequencies. These provisions apply to arsenic.

All CWSs and NTNCWSs that exceed the MCL of 10 µg/L are required to come into compliance 5 years after the publication of the final rule.

Radionuclide Rule

The original Radionuclide Rule was proposed in July 1991, but court action delayed its final promulgation. The final Radionuclides Rule was published in the Federal Register on December 7, 2000. The rule became effective in December 2003. New monitoring requirements have been phased-in the publication date of the final rule and the beginning of the next Standardized Monitoring Framework period on December 31, 2007. "Phased-in monitoring" refers to the fact that States will require some fraction of water systems to complete their initial monitoring requirements each year of the period between the effective date (December 8, 2003) and the beginning of the new cycle (December 31, 2007). Water systems will determine initial compliance under the new monitoring requirements using the average of four quarterly samples or, at state discretion, using appropriate grandfathered data. Compliance will be determined immediately based on the annual average of the quarterly samples for that fraction of systems required by the state to monitor in any given year or based on the results from the grandfathered data. Water systems with existing radionuclides monitoring data demonstrating that the system is out of compliance with new provisions will be out of compliance on the effective date of December 8, 2003.

In the final rule, EPA set the MCL for uranium at 30 micrograms per liter ($\mu\text{g/L}$), using its authority under the SDWA for the first time to set a standard at a higher than the feasible level based on cost-benefit considerations. The standard for combined radium-226/228 remains at 5 picoCuries per liter (pCi/L). However, the rule requires improved monitoring for radium. The final rule retains the interim standards for gross alpha particles at 15 pCi/L and for beta and photon emitters at 4 millirems (mrem).

A summary of the final Radionuclides Rule is provided below. Table 9-10 also lists the existing (1979) and the revised MCLs of the final Radionuclide Rule.

- Affected Systems: Community Water Systems (CWSs); non-CWSs, including transient and non-transient, are exempt.
- MCL Goals (MCLGs) for radionuclides: MCLGs of zero; includes combined radium-226/228; gross alpha, beta particle and photon radioactivity, and uranium
- Radium MCL: Combined Ra-226 and Ra-228 MCL of 5 pCi/L ; based on new risk levels.
- Beta/Photon Radioactivity MCL:
 - ≤ 4 mrem/yr to the total body or any given internal organ except for H-3 and Sr-90
 - H-3 = 20,000 pCi/L ; Sr-90 = 8 pCi/L
 - Total dose from co-occurring beta/photon emitters must be ≤ 4 mrem/yr to the total body of any internal organ;
 - This MCL will be reviewed within 2 to 3 years based on a need for further re-evaluation of the risk management issues.
- Gross alpha MCL: 15 pCi/L excluding uranium and radon, but including Ra-226; maintain current MCL.
- Uranium MCL: 30 $\mu\text{g/L}$; new MCL.
- Polonium-210: Part of gross alpha; monitoring required under the UCMR rule; further action may be proposed at a later date.
- Lead-210: Not regulated; monitoring required under the UCMR rule; further action may be proposed at a later date.

Table 9-10
Existing and Revised MCLs for Radionuclides

Contaminant	1979 MCLs	2000 Radionuclide Rule MCLs
Radium 226/228	5 pCi/L	5 pCi/L
Uranium	N/A	30 pCi/L
Gross Alpha	15 pCi/L	15 pCi/L
Beta Particles and Photon Emitters	4 mrem s	4 mrem

Radon Rule

Radon is a naturally occurring, carcinogenic, radioactive gas. Radon in drinking water increases risk to public health, primarily from inhalation of radon discharged through normal household use, such as showering, but also from ingestion of water. The proposed Radon Rule applies to all community water systems that use groundwater or mixed groundwater and surface water supply sources.

On November 2, 1999, the long anticipated and heavily debated Radon Rule was formally proposed, but EPA missed the SWDA deadline of August 2000 promulgation. EPA has not indicated a final schedule for the promulgation of the Radon Rule at this time.

The rule includes a two-option approach that allows states and water suppliers to reduce radon risks in indoor air while protecting public health from the highest levels of radon in drinking water. The proposed rule includes the following provisions:

- MCLG zero
- MCL 300 pCi/L
- Alternative MCL (AMCL) 4,000 pCi/L

The AMCL provision of the rule applies to water systems that adopt and comply with a multimedia mitigation (MMM) program aimed at reducing household indoor/air health risks from the soil as well as the tap water. The AMCL of 4,000 pCi/L is based on the National Research Council recommended estimate of 10,000 to 1 as the transfer factor from water to air and the national average outdoor radon concentration of 0.4 pCi/L in air. Thus, an estimate of 0.4 pCi/L in air would be equivalent to 4,000 pCi/L in water.

If a state develops an MMM program that is approved by the EPA, public water systems in that state will be able to comply with the AMCL rather than the MCL. Alternatively, if a state chooses not to adopt its own MMM program or a state's MMM program does not meet EPA approval, an individual public water supplier can submit an MMM program for approval. The 1996 SDWA Amendments require that the EPA evaluate MMM programs every 5 years.

Drinking Water Contaminant Candidate List

As amended in 1996, the SWDA requires the EPA to establish a list of contaminants that are known or anticipated to occur in public water systems and may require regulation under the SWDA. The first Contaminant Candidate List (CCL) was published in the Federal Register in March 1998 and included 60 contaminants under consideration for regulation. A second version of the CCL was published in February 2005. The second version of the CCL carries forward 51 of the original 60 unregulated contaminants from the first version of the CCL. The CCL includes both microbiological and chemical contaminants. The CCL published in February 2005 includes 42 chemical contaminants and 9 microbiological contaminants/contaminant groups. Table 9-11 lists the contaminants published in the CCL in February 2005.

Contaminants included in the CCL are studied to develop analytical methods for detecting the contaminants, determine whether they occur in drinking water, and evaluate treatment technologies to remove them from drinking water. In addition, the health effects of the

contaminants are studied to help determine if actions such as drinking water guidance, health advisories, or regulation need to be developed. The CCL alone does not impose any requirements on public water system.

Table 9-11
Contaminant Candidate List (CCL)

Microbiological Contaminants

Adenoviruses
Aeromonas hydrophila
Caliciviruses
Coxsackieviruses
Cyanobacteria (blue-green algae), other freshwater algae, and their toxins
Echoviruses
Helicobacter pylori
Microsporidia (Enterocytozoon & Septata)
Mycobacterium avium intracellulare (MAC)

Chemical Contaminants

1,2,2,2-tetrachloroethane
1,2,4-trimethylbenzene
1,1-dichloroethane
1,1-dichloropropene
1,2-diphenylhydrazine
1,3-dichloropropane
1,3-dichloropropene
2,4,6-trichlorophenol
2,2-dichloropropane
2,4-dichlorophenol
2,4-dinitrophenol
2,4-dinitrotoluene
2,6-dinitrotoluene
2-methyl-Phenol (o-cresol)
Acetochlor
Alachlor ESA & other acetanilide pesticide degradation products
Aluminum
Boron
Bromobenzene

Table 9-11
Contaminant Candidate List (CCL)

DCPA mono-acid degradate
DCPA di-acid degradate
DDE
Diazinon
Disulfoton
Diuron
EPTC (s-ethyl-dipropylthiocarbamate)
Fonofos
p-Isopropyltoluene (p-cymene)
Linuron
Methyl bromide
Methyl-t-butyl ether (MTBE)
Metolachlor
Molinate
Nitrobenzene
Organotins
Perchlorate
Prometon
RDX
Terbacil
Terbufos
Triazines and degradation products of triazines (including, but not limited to Cyanazine, and atrazine-desethyl)
Vanadium

Water Quality Issues

Surface Water Quality

The water system is supplied surface water from the American River, via the Folsom South Canal. Overall, this supply is characterized as excellent quality water with low turbidity and alkalinity. The raw water can be treated to meet all drinking water standards using conventional, direct, and alternative treatment processes. No persistently present constituents have been identified in the river water requiring additional treatment processes, with one exception. Recent increases in recreational activity at the mouth of the Folsom South Canal have led to abnormal increases in waterfowl populations and have in

turn increased the coliform concentration of the surface water supply. Additional disinfection processes have been instituted at the water system's treatment facilities to overcome this rise in microbial contamination.

The water system has two surface water treatment facilities, each classified as using alternative technologies in the treatment of the American River water supply. The Coloma Surface Water Treatment Plant consists of coagulation, flocculation, sedimentation, filtration and disinfection treatment processes. The Pyrites SWTP uses a ballast sand pretreatment technique thereby utilizing treatment processes consisting of coagulation, injection, maturation, clarification, filtration, and disinfection. Water produced by both plants meets existing drinking water standards. Water production by both plants is not expected to be impacted by future regulations currently proposed, with the possible exception of contaminants under consideration for regulation on the Contaminant Candidate List. Other future chemical contaminant regulations for disinfection by-products, endocrine disrupters, and pharmaceutical chemicals entering the surface water supply, have been discussed but are unknown at this time.

Groundwater Quality

The system's wells draw ground water from the Central Sacramento County Subbasin of the Sacramento Groundwater Basin. The Subbasin underlies the central portion of Sacramento County and is bounded by the American River on the north, by the Sacramento River on the west, by the Consumnes River on the south and by the basement rocks of the Sierra Nevada on the east, which run roughly parallel to the county line. These perennial rivers provide recharge to the groundwater aquifers and serve as convenient boundaries for groundwater management purposes.

Portions of the Subbasin are severely impacted by groundwater contamination, caused primarily by improper waste disposal by Aerojet at its rocket propellant manufacturing and testing facility located immediately up gradient and to the east of the water system. The contaminants consist primarily of volatile organic compounds ("VOCs"), perchlorate and N-nitrosodimethylamine ("NDMA"). VOCs were discovered in the local groundwater supply in the early 1980s. Aerojet mitigated the impacts of the VOC contamination at the time by installing granular activated carbon filtration systems at the wellhead of affected wells of the water system.

The presence of perchlorate and NDMA in the groundwater were first reported to the water system in January 1997, and March 1998, respectively. This contamination has caused the water system to destroy or suspend operation of several wells. The water system has been able to compensate for the loss of the contaminated wells and maintain its extractions from the Subbasin by drilling new wells in unaffected areas, upgrading equipment at existing well sites, and making other system improvements.

The water system currently owns a total of 18 operational wells with a combined desing production capacity of 21,125 gpm. Three of the wells have been inactivated due to groundwater contamination. An additional six wells were previously destroyed due to the contamination.

Hydrogeologic consultants have predicted that by 2015 all but two of those wells will experience contamination levels that may cause their inactivation. The two remaining wells,

Wells 17 and 23, are not expected to be impacted until at least 2032. Those two wells have a combined design production capacity of 3,100 gpm.

Future groundwater supply loss by the water system due to these contaminants will be replaced by Aerojet under its Replacement Water Obligations. Under the Obligation, Aerojet will deliver the first 5,000 ac-ft/yr of replacement water by discharging treated groundwater at the Aerojet site into the American River. This water will be wheeled through, and withdrawn from, the Folsom South Canal by the water system at its current surface water point-of-diversion. According to the Obligation, up to an additional 10,200 ac-ft/yr of treated groundwater will be discharged into the American River by Aerojet, recaptured at the Sacramento River by the Sacramento County Water Agency, treated to drinking water standards, and delivered to the water system.

Radon levels in the groundwater supply have been reported in the range of 288 to 965 pCi/L. The USEPA has proposed a radon MCL at 300 pCi/L, with an alternative standard of 4,000 pCi/L if the state has an approved Multimedia Mitigation program to reduce the indoor radon risk from soil and rocks underneath homes and buildings. It is expected the state will develop an approved Multimedia Mitigation program thus allowing the alternative MCL standard.

Table 9-12 summarizes water quality issues and recommendations for wells within the water system.

Table 9-12
Summary of Assessment

Well	Design Capacity	Status	Water Quality Issue/Concern	Existing Treatment	Recommendations
Agnes No. 8	500	Active	Perchlorate, VOCs, NDMA, Radon	None	Plan for Treatment or replacement; Multimedia Mitigation
Alicante No. 1	400	To be Destroyed	VOCs	None	Destroy
Capital No. 23	1,600	Active	Perchlorate, VOCs, NDMA, Radon	None	Plan for Treatment or replacement; Multimedia Mitigation
Citrus No. 13		Destroyed			
Coloma Well No. 20	2,600	Active	Perchlorate, VOCs, NDMA, Radon	Manganese Treatment	Plan for Treatment or replacement; Multimedia Mitigation
Cristobal No. 11	700	To be Destroyed	NDMA	None	Destroy
Dolecetto No. 6	700	Active	Perchlorate, VOCs, NDMA, Radon	None	Plan for Treatment or replacement; Multimedia Mitigation
El Segundo No. 4	350	Active	Perchlorate, VOCs, NDMA, Radon	None	Plan for Treatment or replacement; Multimedia Mitigation
Folsom Blvd No. 15		Destroyed			
Georgetown No. 7	650	Active	Perchlorate, VOCs, NDMA, Radon	None	Plan for Treatment or replacement; Multimedia Mitigation
Gilbert No. 3	700	Active	Perchlorate, VOCs,	None	Plan for Treatment or replacement;

Table 9-12
Summary of Assessment

			NDMA, Radon		Multimedia Mitigation
Gold Country No. 21	1,000	Active	Perchlorate, VOCs, NDMA, Radon	None	Plan for Treatment or replacement; Multimedia Mitigation
Kilgore No. 19		Destroyed			
Marcel No. 5	700	Active	Perchlorate, VOCs, NDMA, Radon	None	Plan for Treatment or replacement; Multimedia Mitigation
Mather No. 18	1,700	Active	Perchlorate, VOCs, NDMA, Radon	None	Plan for Treatment or replacement; Multimedia Mitigation
Mc Gregor No. 9		Destroyed			
Negrara No. 10	700	Active	Perchlorate, VOCs, NDMA, Radon	Manganese treatment	Plan for Treatment or replacement; Multimedia Mitigation
Park No. 17	1,500	Active	Perchlorate, VOCs, NDMA, Radon	None	Plan for Treatment or replacement; Multimedia Mitigation
Pyrites No. 16		Destroyed			
S. Bridge St No. 22A	3,000	Active	Perchlorate, VOCs, NDMA, Radon	None	Plan for Treatment or replacement; Multimedia Mitigation
S. Bridge St No. 22B	2,800	Active	Perchlorate, VOCs, NDMA, Radon	None	Plan for Treatment or replacement; Multimedia Mitigation
Whistler No. 14	850	To be Destroyed	Perchlorate, NDMA	None	Destroy
Wood Cliff No. 12	675	Active	Perchlorate, VOCs, NDMA, Radon	Manganese treatment	Plan for Treatment or replacement; Multimedia Mitigation

Projected Impact of Water Quality

Water quality will impact the supply of both surface water and groundwater to the water system in several ways. After July 1, 2007 the water system will begin replacing 5,000 ac-ft/yr of SMUD Appropriated surface water transfer water with treated groundwater from Aerojet, as it becomes available. This change will in essence change the designation of water usage from surface water to groundwater. However, the treated groundwater from Aerojet will be discharged into and commingle with other water in the American River, flow down the Folsom South Canal, and be withdrawn by the water system at its current surface water point-of-diversion location along the Folsom South Canal. The quality of the water in the Folsom South Canal is not expected to change the ability to treat the water due to this water transfer. As the water system loses additional wells due to groundwater contamination beyond 5,000 ac-ft/yr, the water system's infrastructure will require alternative means to deliver water to its customers. Aerojet will replace the additional contaminated groundwater supply with treated groundwater by a different water transmission approach.

As the water system loses additional wells due to groundwater contamination beyond 5,000 ac-ft/yr, Aerojet's treated groundwater discharges into the American River will eventually be diverted by the Sacramento County Water Agency from the Sacramento River, treated,

and delivered to the water system's distribution system where needed. The quantity of water transferred in this method is not to exceed 10,200 ac-ft/yr. Because the delivered water will be treated to drinking water standards by the County Water Agency, there will be no water quality impact to the water system for this water supply.

Table 9-13 summarizes the projected impact on water supply due to water quality issues with water sources in the water system.

Table 9-13
Summary of Projected Water Supply Changes Due to Water Quality Issues

Water Source Projected Change (percent)	2005	2010	2015	2020	2025	2030
Surface Water - American River (Water system's pre 1914 Water Rights)	0	0	0	0	0	0
Surface Water - American River (SMUD Water Transfer)	0	(100)	0	0	0	0
Groundwater (Untreated)	0	(4.8)	(48.4)	0	0	0
Treated Groundwater via F. S. Canal ⁽²⁾	0	100	0	0	0	0
Aerojet Replacement Water ⁽³⁾	0	0	100	0	0	0

Notes

1. Table format based on DWR Guidance Document Table 39
2. Treated Groundwater via the Sacramento River.
3. Aerojet Replacement Water via Sacramento County

Distribution System Water Quality

Distribution system water quality monitoring is performed for several water quality parameters in the Cordova System, including general physical parameters, presence of coliform bacteria, disinfectant and disinfection by-product levels, and corrosivity of the water by monitoring lead and copper levels at customers' water taps. All monitoring parameters and levels currently meet drinking water standards. The ability to continue to meet these standards is not expected to change in the foreseeable future, with one exception. Drinking water standard levels for disinfection by-products will be lowering in the future in accordance with the Stage 2 D-DBP Rule. In addition, precursors of disinfection by-products will increase in the distribution system as the water system moves away from untreated groundwater supplies. Along with the increase in disinfection by-product precursors in the treated groundwater supplies, the water system will become dependent on water storage facilities to maintain peak hour water demands with the loss of wells. Water age of the treated groundwater will inadvertently increase. This increase in water age and increase in disinfection by-products precursors will certainly increase disinfection by-product levels. It is unknown at this time if the increased levels of disinfection by-products will be at levels of concern.

Emerging Water Quality Issues

Ammonium perchlorate is used as a main component in solid rocket propellant, and can be found in some types of ammunitions and fireworks. The California Legislature had required the CDHS to adopt a new drinking water standard for perchlorate by January 1, 2004. In advance of the requirement, the Office of Environmental Health Hazard Assessment (OEHHA) set a public health goal for perchlorate at 6 µg/L in March of 2004. The primary health concern related to perchlorate is its effect on the thyroid gland's ability to produce hormones required for normal growth and development. CDHS anticipates it will establish an MCL for perchlorate during 2005. Impact from the contaminant to the water system has been significant since its discovery in the groundwater supply in 1997 as previously discussed. Although the contaminant has had significant effects on the water system's water supply, mitigation measures are in place for any future impacts to the system's groundwater supplies.

The California Legislature required the CDHS to adopt a new drinking water standard for arsenic by June 30, 2004. In advance of the requirement, the Office of Environmental Health Hazard Assessment (OEHHA) set a public health goal for arsenic at 0.004 µg/L, based on lung and urinary bladder cancer risk. Monitoring results from drinking water sources throughout the state reflect its natural occurrence. They also show that considerably more sources have arsenic detections above the federal 10 µg/L MCL compared to the current MCL of 50 µg/L. Arsenic levels in the water system's water sources range from less than 2.0 to 5.6 µg/L. Arsenic levels are non-detectable in the surface water source. The CDHS continues to assess where they will set the new state MCL for arsenic.

In 2000, there was significant interest in the detection and possible health effects of chromium 6 in drinking water supplies throughout the state. In 2001, the OEHHA withdrew their previously established Public Health Goal (risk assessment level) of 2.5 µg/L for total chromium. The current MCL enforced by the CDHS is 50 µg/L for total chromium, and OEHHA is in the process of establishing a specific Public Health Goal for chromium 6. The water system initiated sampling of all its water sources for total chromium and chromium 6 in 2001. Total Chromium and chromium 6 ranged from less than 10 to 11 µg/L and from less than 1 to 2.5 µg/L, respectively. Total chromium and chromium 6 were non-detectable in the surface water source.

Source water protection is important for all of California. The CDHS requires large water systems supplying surface water to complete a watershed Sanitary Survey every five years to examine possible sources of drinking water contamination. The last Survey, performed in December of 2003 did not identify any persistent constituents requiring additional treatment processes. It did note that peak turbidity levels, number of microorganisms, and organic carbon concentrations occur during wet weather and storm events. Watershed runoff and discharges that contribute to these events include urban runoff, runoff from the lower American riparian corridor, and occasional sewer collection system spills. Stewardship projects in the watershed are being formulated and implemented to reduce these potential concerns to the water system's surface water supply.

A similar requirement from the USEPA called for all utilities to complete a Source Water Assessment for all water sources. The water system completed the Assessment in 2002. The

water sources were found to be most vulnerable to contaminants in the water supplies associated with known contaminant plumes and recreational area activities for the surface water supply. The groundwater sources were considered most vulnerable to the following activities not associated with any detected contaminants in the water supply as of this time: gas stations, automobile repair shops, chemical or petroleum pipelines, chemical or petroleum processing or storage, dry cleaners, unauthorized dumping, military installations, historic mining operations, plastics or synthetics producers, sewer collection systems, underground storage tanks confirmed leaking or not yet upgraded, and gas wells.

Until recently, MTBE was the primary oxygenate in virtually all gasoline used in California. It was introduced to surface water bodies from motor exhaust of recreational watercraft, and into groundwater supplies by leaking underground storage tanks. The CDHS adopted a primary MCL of 13 µg/L for MTBE based on carcinogenicity studies in animals. They also established a secondary MCL for MTBE at 5 µg/L, based upon taste and odor concerns. MTBE has been non-detectable in all water sources serving the water system to date. However, this could change in time as known leaking storage tanks and other MTBE plumes find their way into the water system's well water supply. According to the 2002 Drinking Water Source Assessment for the water system, all but four of the remaining 15 active well water sources are within the sphere of influence of known leaky underground storage tanks, gasoline service stations, auto repair shops, or petroleum pipelines.

The change in the national and international security situation has led to an increased concern about the ability to protect the nation's water supply. In coordination with its parent company, the water system added new security measures in 2001 and continues to upgrade and refine procedures. Changes have included added surveillance equipment, increases in water quality tests, as well as developing contingency plans that coordinate with the Homeland Security Office's multicolored tiered risk alert system.

CPUC Interface. One of the four key principles of the CPUC draft Water Action Plan is to provide safe, high quality water to all regulated water utility customers. Water Plan objectives include maintaining the highest standards of water quality and promoting infrastructure investment including investments to protect water quality. Specific proposed actions to support water plan objectives include strengthening inter-agency relations between the CPUC and Department of Health Services, and developing funding mechanisms to address water quality concerns. GSWC has suggested additional steps that can be taken by the CPUC to ensure water quality including assurances of timely recovery of water pollution clean-up costs.

Chapter 10. Water Service Reliability

Section 10635 of the Act requires that an assessment of water service reliability for various climatic conditions be undertaken. The Act states:

Section 10635

- (a) *Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.*
- (b) *The urban water supplier shall provide that portion of its urban water management plan prepared pursuant to this article to any city or county within which it provides water supplies no later than 60 days after the submission of its urban water management plan.*
- (c) *Nothing in this article is intended to create a right or entitlement to water service or any specific level of water service.*
- (d) *Nothing in this article is intended to change existing law concerning an urban water supplier's obligation to provide water service to its existing customers or to any potential future customers.*

This chapter provides a water supply and demand assessment for the Cordova System for a normal year, a single-dry year, and multiple-dry years. The following is a summary of the water supply sources and reliability of those sources for the Cordova System. The details of water supply sources and the reliability of these supplies are provided in Chapter 3. Water demand projections are documented in Chapter 4.

The Cordova System obtains its water supply from three sources: surface water, local groundwater, and Replacement Water under the Master Settlement Agreement and Release (Settlement Agreement) with Aerojet (discussed in Chapter 3). Replacement Water will be made available by Aerojet and the Sacramento County Water Agency (SCWA) to offset groundwater lost due to contamination. In addition, GSWC has entered into a temporary water transfer agreement with SMUD to allow GSWC to divert up to an additional 10,000 ac-ft/yr from the Folsom South Canal under SMUD's Central Valley Project (CVP) contract entitlement. In general, GSWC's supply is expected to be 100 percent reliable through 2030. This reliability is a result of: 1) highly reliable surface water supplies from the American River, 2) the Settlement Agreement, and 3) historically reliable groundwater supply from the Central Sacramento Basin.

The Cordova System has a pre-1914 appropriative right of up to 5,000 ac-ft/yr from the American River. Because appropriative rights are granted priority based upon the year of initiation, the early priority date of GSWC's American River right (1851) provides this right

a high priority, which in turn makes the water supply highly reliable even during drought periods.

Under its Replacement Water obligation, Aerojet will deliver the first 5,000 ac-ft/yr of groundwater treated and discharged by it into the American River to GSWC at GSWC's existing diversion point on the Folsom South Canal through an exchange (for details see Chapter 3). GSWC will reduce its reliance upon the SMUD water transfer, as soon as the Replacement Water supplies become available. Aerojet is required to supply 5,000 ac-ft/yr of Replacement Water without regard to other supplies available to GSWC and without regard to whether GSWC loses additional wells to contamination.

Since 1995 GSWC has reliably extracted an average of 11,753 ac-ft/yr of groundwater from the Central Sacramento Basin. GSWC's highest historical production occurred in 2001, when GSWC pumped 13,257 ac-ft/yr. However, groundwater contamination from the Aerojet facility has impacted portions of the groundwater supply within the subbasin. It is expected that all of GSWC's production wells but Wells 17 and 23 will be inactivated as a result of the migrating groundwater contamination. As GSWC's other wells close, its rights to additional Replacement Water will increase to cover any losses that occur, up to a maximum of 10,200 ac-ft/yr.

In addition to the 5,000 ac-ft/yr of Replacement Water discussed above (and in Chapter 3) and diverted by GSWC from the Folsom South Canal, SCWA will recapture, treat and deliver to GSWC groundwater discharged by Aerojet into the American River. The amount of water supply that GSWC receives will depend on GSWC's loss of additional wells to contamination. If GSWC does not lose additional wells, this water supply will remain in reserve. Delivery of this potable water supply is contingent upon SCWA's construction of diversion, treatment and delivery facilities, which are estimated to be completed between 2010 and 2012.

In summary, under the Master Settlement Agreement and Release with Aerojet, Aerojet guarantees that Replacement Water supplies will be made available to offset lost groundwater production in the Cordova System, up to a maximum of 15,200 ac-ft/yr. Accordingly, when combined with GSWC's 5000 ac-ft/yr of Folsom Canal surface water rights, the Cordova System is ensured of a perpetual reliable water supply of at least 20,200 ac-ft/yr. Groundwater production from the two remaining wells is expected to produce approximately 4,500 ac-ft/yr.

The following sections present the normal water year, single-dry year, multiple-dry year water supply and demand assessments.

Normal Water Year Analysis

Table 10-1 provides the projected water supply from surface water and groundwater in normal water years (see Chapter 3 for details).

Table 10-1
Projected Normal Water Year Supply

	2010	2015	2020	2025	2030
Total Water Supply (ac-ft/yr)	27,650	24,700	24,700	24,700	24,700
Percent of Year 2005	119	106	106	106	106

Notes
1. Table format based on DWR Guidance Document Table 40

Table 10-2 provides water demand projections in normal water years (see Chapter 4 for details).

Table 10-2
Summary of Projected Normal Water Year Demands

	2010	2015	2020	2025	2030
Total Water Demand (ac-ft/yr)	20,933	22,068	22,323	22,334	22,334
Percent of Year 2005	111	117	119	119	119

Notes
1. Table format based on DWR Guidance Document Table 41

Table 10-3 summarizes the service reliability assessment for normal water years based on water supply and water demand projections. The available supplies exceed the supplies needed to meet the projected demands. The excess supply ranged between 11 and 32 percent of the projected demand. As described above (and in Chapter 3), surface water from the American River, local groundwater from the Central Sacramento Basin, and Aerojet Replacement Water supplies are expected to be 100 percent reliable to meet the projected demands through 2030.

Table 10-3
Comparison of Projected Normal Year Supply and Demand

	2010	2015	2020	2025	2030
Water Supply Total (ac-ft/yr)	27,650	24,700	24,700	24,700	24,700
Water Demand Total (ac-ft/yr)	20,933	22,068	22,323	22,334	22,334
Difference (supply minus demand)	6,717	2,632	2,377	2,366	2,366
Difference as Percent of Supply	24	11	10	10	10
Difference as Percent of Demand	32	12	11	11	11

Notes
1. Table format based on DWR Guidance Document Table 42

Single Dry-Year Analysis

Under the Settlement Agreement, GSWC has worked to ensure supply reliability over a range of hydrologic conditions. All the projected available supplies will be provided to meet the needs of a growing population even under recurrences of the worst historical hydrologic conditions. With 5,000 ac-ft/yr of available surface water rights from the American River ,

groundwater, and up to 15,200 ac-ft/yr of Replacement Water from Aerojet, a sufficient water supply exists to meet all of the water demands in the Cordova System.

Table 10-4 presents projected single-dry year water supplies to meet the projected demands. It is assumed that the single-dry year supplies are the same as those for the normal years because surface water, groundwater, and Replacement Water will meet projected water demands under all anticipated hydrologic conditions.

Table 10-4
Projected Single-Dry Year Water Supply

	2010	2015	2020	2025	2030
Water Supply (ac-ft/yr)	27,650	24,700	24,700	24,700	24,700
Percent of Year 2005	119	106	106	106	106
Notes					
1. Table format based on DWR Guidance Document Table 43					

Table 10-5 provides projected single-dry year water demands. It is assumed that the single-dry year demands are the same as those water demands projected for the normal years.

Table 10-5
Summary of Projected Single-Dry Year Demands

	2010	2015	2020	2025	2030
Water Demand in ac-ft/yr	20,933	22,068	22,323	22,334	22,334
Percent of Year 2005	111	117	119	119	119
Notes					
1. Table format based on DWR Guidance Document Table 44					

Table 10-6 demonstrates the reliability of water supplies to meet projected annual water demands for the Cordova System in a single-dry year. It should be noted that the supplies available exceed the supplies needed to meet the projected demands (see Chapter 3 for details). Buffer (excess available supply) serves to increase reliability of supplies. The combination of 5,000 ac-ft/yr of surface water rights from the American River, groundwater, and Replacement Water from Aerojet ensures that GSWC has the supplies necessary to meet its water supply demands through 2030.

Table 10-6
Comparison of Projected Supply and Demand for Single Dry Year

	2010	2015	2020	2025	2030
Supply Total (ac-ft/yr)	27,650	24,700	24,700	24,700	24,700
Demand Total (ac-ft/yr)	20,933	22,068	22,323	22,334	22,334
Difference (supply minus demand)	6,717	2,632	2,377	2,366	2,366
Difference as Percent of Supply	24	11	10	10	10
Difference as Percent of Demand	32	12	11	11	11

Notes

1. Table format based on DWR Guidance Document Table 45

Multiple Dry-Year Analysis

Table 10-7 presents the projected multiple-dry year water supply and demand assessment. It is assumed that the multiple-dry year water supplies are the same as those for the normal years because surface water, groundwater, and Replacement Water will meet projected water demands under all anticipated hydrologic conditions. The third year of the multiple-dry year water supply projection represents the end of each 3-year multiple-dry year period as required for the multiple-dry year analysis. It is assumed that the water demand for the preceding two years (of the 3-year multiple-dry year period) will be the same as those in the third year. For example, the water demand projection for 2010 has been used as the water demands projected in 2009 and 2008.

Table 10-7 demonstrates that the available water supplies exceed the supplies needed to meet the projected demands for each multiple-dry year period. Excess available supplies serve to increase reliability of supplies. Since GSWC began operating the Cordova System in 1964, it has satisfied the system's water demands in both wet and dry cycles including the droughts of 1976-1977 and 1987-1992. With the Settlement Agreement in place, GSWC will be able to reliably maintain a consistent water supply to satisfy current and anticipated future demands within the Cordova System despite the potential that migration of existing contamination may impact more of GSWC's wells. As explained in Chapter 3, the Settlement Agreement and the side agreement with SCWA ensures a Replacement Water supply of up to 15,200 ac-ft/yr, which, when combined with GSWC's 5,000 ac-ft/yr of available pre-1914 American River water rights and continued groundwater production of 4,500 ac-ft/yr, will ensure a consistent supply of up to 24,700 ac-ft/yr of water under buildout conditions. This water supply is expected to be greater than the projected water demands in multiple-dry years. Because groundwater availability is not immediately susceptible to drought conditions and because GSWC's pre-1914 American River surface water rights are of a high priority, the Cordova System's water supply has historically remained consistent and has experienced no change in supply during drought conditions. Therefore, the supplies are expected to be 100 percent reliable to meet the projected demands through 2030.

Table 10-7
Projected Multiple-Dry Year Water Supply and Demand Assessment

Year	Supply (ac-ft/yr)	Demand (ac-ft/yr)	Difference	Difference as Percent of Supply	Difference as Percent of Demand
2006					
2007					
2008	27,650	20,933	6,717	24	32
2009	27,650	20,933	6,717	24	32
2010	27,650	20,933	6,717	24	32
2011					
2012					
2013	24,700	22,068	2,632	11	12
2014	24,700	22,068	2,632	11	12
2015	24,700	22,068	2,632	11	12
2016					
2017					
2018	24,700	22,323	2,377	10	11
2019	24,700	22,323	2,377	10	11
2020	24,700	22,323	2,377	10	11
2021					
2022					
2023	24,700	22,334	2,366	10	11
2024	24,700	22,334	2,366	10	11
2025	24,700	22,334	2,366	10	11
2026					
2027					
2028	24,700	22,334	2,366	10	11
2029	24,700	22,334	2,366	10	11
2030	24,700	22,334	2,366	10	11

Notes

1. This assessment is based on the 3-year multiple-dry year period ending in 2010, 2015, 2020, 2025, and 2030
2. Table format based on DWR Guidance Document Tables 47 through 57

Chapter 11. References

- California Department of Water Resources (DWR). 2003. *California's Groundwater: Bulletin 118-2003*.
- _____. 2005. *California's Water Plan Update 2005 - Public Review Draft: Bulletin 160-05*.
- _____. 2005. *Guidebook to Assist Water Suppliers in the Preparation of a 2005 Urban Water Management Plan*. January 18.
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- SACOG Projections. 2004. *Projections Update Metropolitan Transportation Plan 2027*.
<http://www.sacog.org/demographics/projections/Projections%20Doc.pdf>
- UWMP. 2000. *Draft Urban Water Management Plan for Cordova Customer Service Area*. Brown & Caldwell
- Western Regional Climate Center (WRCC). 2005. *Period of Record Monthly Climate Summary*.
<http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?cafols+nca>.

Appendix A
Urban Water Management Planning Act

Established: AB 797, Klehs, 1983

Amended: AB 2661, Klehs, 1990

AB 11X, Filante, 1991

AB 1869, Speier, 1991

AB 892, Frazee, 1993

SB 1017, McCorquodale, 1994

AB 2853, Cortese, 1994

AB 1845, Cortese, 1995

SB 1011, Polanco, 1995

AB 2552, Bates, 2000

SB 553, Kelley, 2000

SB 610, Costa, 2001

AB 901, Daucher, 2001

SB 672, Machado, 2001

SB 1348, Brulte, 2002

SB 1384 Costa, 2002

SB 1518 Torlakson, 2002

AB 105, Wiggins, 2003

SB 318, Alpert, 2004

CALIFORNIA WATER CODE DIVISION 6
PART 2.6. URBAN WATER MANAGEMENT PLANNING
CHAPTER 1. GENERAL DECLARATION AND POLICY

10610. This part shall be known and may be cited as the "Urban Water Management Planning Act."

10610.2. (a) The Legislature finds and declares all of the following:

- (1) The waters of the state are a limited and renewable resource subject to ever-increasing demands.
- (2) The conservation and efficient use of urban water supplies are of statewide concern; however, the planning for that use and the implementation of those plans can best be accomplished at the local level.
- (3) A long-term, reliable supply of water is essential to protect the productivity of California's businesses and economic climate.
- (4) As part of its long-range planning activities, every urban water supplier should make every effort to ensure the appropriate level of reliability in its water service sufficient to meet the needs of its various categories of customers during normal, dry, and multiple dry water years.
- (5) Public health issues have been raised over a number of contaminants that have been identified in certain local and imported water supplies.
- (6) Implementing effective water management strategies, including groundwater storage projects and recycled water projects, may require specific water quality and salinity targets for meeting groundwater basins water quality objectives and promoting beneficial use of recycled water.

- (7) Water quality regulations are becoming an increasingly important factor in water agencies' selection of raw water sources, treatment alternatives, and modifications to existing treatment facilities.
 - (8) Changes in drinking water quality standards may also impact the usefulness of water supplies and may ultimately impact supply reliability.
 - (9) The quality of source supplies can have a significant impact on water management strategies and supply reliability.
 - (b) This part is intended to provide assistance to water agencies in carrying out their long-term resource planning responsibilities to ensure adequate water supplies to meet existing and future demands for water.
- 10610.4. The Legislature finds and declares that it is the policy of the state as follows:
- (a) The management of urban water demands and efficient use of water shall be actively pursued to protect both the people of the state and their water resources.
 - (b) The management of urban water demands and efficient use of urban water supplies shall be a guiding criterion in public decisions.
 - (c) Urban water suppliers shall be required to develop water management plans to actively pursue the efficient use of available supplies.

CHAPTER 2. DEFINITIONS

10611. Unless the context otherwise requires, the definitions of this chapter govern the construction of this part.

10611.5. "Demand management" means those water conservation measures, programs, and incentives that prevent the waste of water and promote the reasonable and efficient use and reuse of available supplies.

10612. "Customer" means a purchaser of water from a water supplier who uses the water for municipal purposes, including residential, commercial, governmental, and industrial uses.

10613. "Efficient use" means those management measures that result in the most effective use of water so as to prevent its waste or unreasonable use or unreasonable method of use.

10614. "Person" means any individual, firm, association, organization, partnership, business, trust, corporation, company, public agency, or any agency of such an entity.

10615. "Plan" means an urban water management plan prepared pursuant to this part. A plan shall describe and evaluate sources of supply, reasonable and practical efficient uses, reclamation and demand management activities. The components of the plan may vary according to an individual community or area's characteristics and its capabilities to efficiently use and conserve water. The plan shall address measures for residential, commercial, governmental, and industrial water demand management as set forth in Article 2 (commencing with Section 10630) of Chapter 3. In addition, a strategy and time schedule for implementation shall be included in the plan.

10616. "Public agency" means any board, commission, county, city and county, city, regional agency, district, or other public entity.

10616.5. "Recycled water" means the reclamation and reuse of wastewater for beneficial use.

10617. "Urban water supplier" means a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually. An urban water

supplier includes a supplier or contractor for water, regardless of the basis of right, which distributes or sells for ultimate resale to customers. This part applies only to water supplied from public water systems subject to Chapter 4 (commencing with Section 116275) of Part 12 of Division 104 of the Health and Safety Code.

CHAPTER 3. URBAN WATER MANAGEMENT PLANS

Article 1. General Provisions

10620.

- (a) Every urban water supplier shall prepare and adopt an urban water management plan in the manner set forth in Article 3 (commencing with Section 10640).
- (b) Every person that becomes an urban water supplier shall adopt an urban water management plan within one year after it has become an urban water supplier.
- (c) An urban water supplier indirectly providing water shall not include planning elements in its water management plan as provided in Article 2 (commencing with Section 10630) that would be applicable to urban water suppliers or public agencies directly providing water, or to their customers, without the consent of those suppliers or public agencies.
- (d)(1) An urban water supplier may satisfy the requirements of this part by participation in area wide, regional, watershed, or basin wide urban water management planning where those plans will reduce preparation costs and contribute to the achievement of conservation and efficient water use.
- (2) Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.
- (e) The urban water supplier may prepare the plan with its own staff, by contract, or in cooperation with other governmental agencies.
- (f) An urban water supplier shall describe in the plan water management tools and options used by that entity that will maximize resources and minimize the need to import water from other regions.

10621.

- (a) Each urban water supplier shall update its plan at least once every five years on or before December 31, in years ending in five and zero.
- (b) Every urban water supplier required to prepare a plan pursuant to this part shall notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. The urban water supplier may consult with, and obtain comments from, any city or county that receives notice pursuant to this subdivision.
- (c) The amendments to, or changes in, the plan shall be adopted and filed in the manner set forth in Article 3 (commencing with Section 10640).

Article 2. Contents of Plans

10630. It is the intention of the Legislature, in enacting this part, to permit levels of water management planning commensurate with the numbers of customers served and the volume of water supplied.

10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:

(a) Describe the service area of the supplier, including current and projected population, climate, and other demographic factors affecting the supplier's water management planning. The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is available.

(b) Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a). If groundwater is identified as an existing or planned source of water available to the supplier, all of the following information shall be included in the plan:

- (1) A copy of any groundwater management plan adopted by the urban water supplier, including plans adopted pursuant to Part 2.75 (commencing with Section 10750), or any other specific authorization for groundwater management.
- (2) A description of any groundwater basin or basins from which the urban water supplier pumps groundwater. For those basins for which a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree. For basins that have not been adjudicated, information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition.
- (3) A detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.
- (4) A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the urban water supplier. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(c) Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable, and provide data for each of the following:

- (1) An average water year.
- (2) A single dry water year.
- (3) Multiple dry water years.

For any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climatic factors, describe plans to supplement or replace that source with alternative sources or water demand management measures, to the extent practicable.

(d) Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.

(e)(1) Quantify, to the extent records are available, past and current water use, over the same five-year increments described in subdivision (a), and projected water use, identifying the uses among water use sectors including, but not necessarily limited to, all of the following uses:

- (A) Single-family residential.
 - (B) Multifamily.
 - (C) Commercial.
 - (D) Industrial.
 - (E) Institutional and governmental.
 - (F) Landscape.
 - (G) Sales to other agencies.
 - (H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof.
 - (I) Agricultural.
- (2) The water use projections shall be in the same five-year increments described in subdivision (a).
- (f) Provide a description of the supplier's water demand management measures. This description shall include all of the following:
- (1) A description of each water demand management measure that is currently being implemented, or scheduled for implementation, including the steps necessary to implement any proposed measures, including, but not limited to, all of the following:
- (A) Water survey programs for single-family residential and multifamily residential customers.
 - (B) Residential plumbing retrofit.
 - (C) System water audits, leak detection, and repair.
 - (D) Metering with commodity rates for all new connections and retrofit of existing connections.
 - (E) Large landscape conservation programs and incentives.
 - (F) High-efficiency washing machine rebate programs.
 - (G) Public information programs.
 - (H) School education programs.
 - (I) Conservation programs for commercial, industrial, and institutional accounts.
 - (J) Wholesale agency programs.
 - (K) Conservation pricing.
 - (L) Water conservation coordinator.
 - (M) Water waste prohibition.
 - (N) Residential ultra-low-flush toilet replacement programs.
- (2) A schedule of implementation for all water demand management measures proposed or described in the plan.
- (3) A description of the methods, if any, that the supplier will use to evaluate the effectiveness of water demand management measures implemented or described under the plan.
- (4) An estimate, if available, of existing conservation savings on water use within the supplier's service area, and the effect of the savings on the supplier's ability to further reduce demand.
- (g) An evaluation of each water demand management measure listed in paragraph (1) of subdivision (f) that is not currently being implemented or scheduled for implementation. In the course of the evaluation, first consideration shall be given to water demand management measures, or combination of measures, that offer lower

incremental costs than expanded or additional water supplies. This evaluation shall do all of the following:

- (1) Take into account economic and noneconomic factors, including environmental, social, health, customer impact, and technological factors.
 - (2) Include a cost-benefit analysis, identifying total benefits and total costs.
 - (3) Include a description of funding available to implement any planned water supply project that would provide water at a higher unit cost.
 - (4) Include a description of the water supplier's legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation.
- (h) Include a description of all water supply projects and water supply programs that may be undertaken by the urban water supplier to meet the total projected water use as established pursuant to subdivision (a) of Section 10635. The urban water supplier shall include a detailed description of expected future projects and programs, other than the demand management programs identified pursuant to paragraph (1) of subdivision (f), that the urban water supplier may implement to increase the amount of the water supply available to the urban water supplier in average, single-dry, and multiple-dry water years. The description shall identify specific projects and include a description of the increase in water supply that is expected to be available from each project. The description shall include an estimate with regard to the implementation timeline for each project or program.
- (i) Describe the opportunities for development of desalinated water, including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply.
- (j) Urban water suppliers that are members of the California Urban Water Conservation Council and submit annual reports to that council in accordance with the "Memorandum of Understanding Regarding Urban Water Conservation in California," dated September 1991, may submit the annual reports identifying water demand management measures currently being implemented, or scheduled for implementation, to satisfy the requirements of subdivisions (f) and (g).
- (k) Urban water suppliers that rely upon a wholesale agency for a source of water, shall provide the wholesale agency with water use projections from that agency for that source of water in five-year increments to 20 years or as far as data is available. The wholesale agency shall provide information to the urban water supplier for inclusion in the urban water supplier's plan that identifies and quantifies, to the extent practicable, the existing and planned sources of water as required by subdivision (b), available from the wholesale agency to the urban water supplier over the same five-year increments, and during various water -year types in accordance with subdivision (c). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan informational requirements of subdivisions (b) and (c).
- 10631.5. The department shall take into consideration whether the urban water supplier is implementing or scheduled for implementation, the water demand management activities that the urban water supplier identified in its urban water management plan, pursuant to Section 10631, in evaluating applications for grants and loans made available pursuant to Section 79163. The urban water supplier may submit to the department copies of its annual reports and other relevant documents to assist the department in determining whether the urban water supplier is implementing or scheduling the implementation of water demand management activities.

10632. The plan shall provide an urban water shortage contingency analysis that includes each of the following elements that are within the authority of the urban water supplier:

- (a) Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply, and an outline of specific water supply conditions which are applicable to each stage.
- (b) An estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency's water supply.
- (c) Actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.
- (d) Additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.
- (e) Consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply.
- (f) Penalties or charges for excessive use, where applicable.
- (g) An analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.
- (h) A draft water shortage contingency resolution or ordinance.
- (i) A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.

10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. The preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area, and shall include all of the following:

- (a) A description of the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.
- (b) A description of the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use.
- (c) A description and quantification of the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.
- (d) The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected pursuant to this subdivision.

(e) A description of actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.

(f) A plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use. 10634. The plan shall include information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments as described in subdivision (a) of Section 10631, and the manner in which water quality affects water management strategies and supply reliability.

Article 2.5 Water Service Reliability

10635. (a) Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.

(b) The urban water supplier shall provide that portion of its urban water management plan prepared pursuant to this article to any city or county within which it provides water supplies no later than 60 days after the submission of its urban water management plan.

(c) Nothing in this article is intended to create a right or entitlement to water service or any specific level of water service.

(d) Nothing in this article is intended to change existing law concerning an urban water supplier's obligation to provide water service to its existing customers or to any potential future customers.

Article 3. Adoption and Implementation of Plans

10640. Every urban water supplier required to prepare a plan pursuant to this part shall prepare its plan pursuant to Article 2 (commencing with Section 10630). The supplier shall likewise periodically review the plan as required by Section 10621, and any amendments or changes required as a result of that review shall be adopted pursuant to this article.

10641. An urban water supplier required to prepare a plan may consult with, and obtain comments from, any public agency or state agency or any person who has special expertise with respect to water demand management methods and techniques.

10642. Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan. Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection and shall hold a public hearing thereon. Prior to the hearing, notice of the time and place of hearing shall be published within the jurisdiction of the publicly owned water supplier pursuant to

Section 6066 of the Government Code. The urban water supplier shall provide notice of the time and place of hearing to any city or county within which the supplier provides water supplies. A privately owned water supplier shall provide an equivalent notice within its service area. After the hearing, the plan shall be adopted as prepared or as modified after the hearing.

10643. An urban water supplier shall implement its plan adopted pursuant to this chapter in accordance with the schedule set forth in its plan.

10644. (a) An urban water supplier shall submit to the department, the California State Library, and any city or county within which the supplier provides water supplies a copy of its plan no later than 30 days after adoption. Copies of amendments or changes to the plans shall be submitted to the department, the California State Library, and any city or county within which the supplier provides water supplies within 30 days after adoption.

(b) The department shall prepare and submit to the Legislature, on or before December 31, in the years ending in six and one, a report summarizing the status of the plans adopted pursuant to this part. The report prepared by the department shall identify the outstanding elements of the individual plans. The department shall provide a copy of the report to each urban water supplier that has filed its plan with the department. The department shall also prepare reports and provide data for any legislative hearings designed to consider the effectiveness of plans submitted pursuant to this part.

10645. Not later than 30 days after filing a copy of its plan with the department, the urban water supplier and the department shall make the plan available for public review during normal business hours.

CHAPTER 4. MISCELLANEOUS PROVISIONS

10650. Any actions or proceedings to attack, review, set aside, void, or annul the acts or decisions of an urban water supplier on the grounds of noncompliance with this part shall be commenced as follows:

(a) An action or proceeding alleging failure to adopt a plan shall be commenced within 18 months after that adoption is required by this part.

(b) Any action or proceeding alleging that a plan, or action taken pursuant to the plan, does not comply with this part shall be commenced within 90 days after filing of the plan or amendment thereto pursuant to Section 10644 or the taking of that action.

10651. In any action or proceeding to attack, review, set aside, void, or annul a plan, or an action taken pursuant to the plan by an urban water supplier on the grounds of noncompliance with this part, the inquiry shall extend only to whether there was a prejudicial abuse of discretion. Abuse of discretion is established if the supplier has not proceeded in a manner required by law or if the action by the water supplier is not supported by substantial evidence.

10652. The California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) does not apply to the preparation and adoption of plans pursuant to this part or to the implementation of actions taken pursuant to Section 10632. Nothing in this part shall be interpreted as exempting from the California Environmental Quality Act any project that would significantly affect water supplies for fish and wildlife, or any project for implementation of the plan, other than projects implementing Section 10632, or any project for expanded or additional water supplies.

10653. The adoption of a plan shall satisfy any requirements of state law, regulation, or order, including those of the State Water Resources Control Board and the Public Utilities Commission, for the preparation of water management plans or conservation plans; provided, that if the State Water Resources Control Board or the Public Utilities Commission requires additional information concerning water conservation to implement its existing authority, nothing in this part shall be deemed to limit the board or the commission in obtaining that information. The requirements of this part shall be satisfied by any urban water demand management plan prepared to meet federal laws or regulations after the effective date of this part, and which substantially meets the requirements of this part, or by any existing urban water management plan which includes the contents of a plan required under this part.

10654. An urban water supplier may recover in its rates the costs incurred in preparing its plan and implementing the reasonable water conservation measures included in the plan. Any best water management practice that is included in the plan that is identified in the "Memorandum of Understanding Regarding Urban Water Conservation in California" is deemed to be reasonable for the purposes of this section.

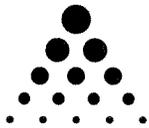
10655. If any provision of this part or the application thereof to any person or circumstances is held invalid, that invalidity shall not affect other provisions or applications of this part which can be given effect without the invalid provision or application thereof, and to this end the provisions of this part are severable.

10656. An urban water supplier that does not prepare, adopt, and submit its urban water management plan to the department in accordance with this part, is ineligible to receive funding pursuant to Division 24 (commencing with Section 78500) or Division 26 (commencing with Section 79000), or receive drought assistance from the state until the urban water management plan is submitted pursuant to this article.

10657. (a) The department shall take into consideration whether the urban water supplier has submitted an updated urban water management plan that is consistent with Section 10631, as amended by the act that adds this section, in determining whether the urban water supplier is eligible for funds made available pursuant to any program administered by the department.

(b) This section shall remain in effect only until January 1, 2006, and as of that date is repealed, unless a later enacted statute, that is enacted before January 1, 2006, deletes or extends that date.

Appendix B
Public Hearing Notice and Meeting Minutes



Golden State
Water Company

A Subsidiary of American States Water Company

Notice of Public Hearing

In conformance with the California Urban Water Management Planning Act, Golden State Water Company (formerly Southern California Water Company) is hosting a public hearing on Monday, November 28, 2005 at 7:00 p.m. at the Golden State Water Company, Region I Headquarters Office, 3035 Prospect Park Drive, Rancho Cordova, CA, to solicit comments on the Urban Water Management Plan (UWMP) for the Cordova water system. The UWMP is available for public review prior to the public hearing and can be reviewed during normal business hours at:

Cordova Customer Service Office
Golden State Water Company
3035 Prospect Park Drive, Suite 50
Rancho Cordova, CA 95670

Notice of Public Hearing

In conformance with the California Urban Water Management Planning Act, Golden State Water Company (formerly Southern California Water Company) is hosting a public hearing on Monday, November 28, at 7:00 p.m. at the Golden State Water Company, Region I Headquarters Office, 3035 Prospect Park Drive, Suite 60, Rancho Cordova, CA 95670, to solicit comments on the Urban Water Management Plans (UWMP) for the Cordova water system. The UWMP is available for public review prior to the public hearing and can be reviewed during normal business hours at:

Cordova Customer Service Office
Golden State Water Company
3035 Prospect Park Drive, **Suite 50**
Rancho Cordova, CA 95670



GOLDEN STATE WATER COMPANY
3035 PROSPECT PARK DR
ATTN: KAREN GOMEZ/ ENG & PLAN
RANCHO CORDOVA CA 95670-

DECLARATION OF PUBLICATION
(C.C.P. 2015.5)

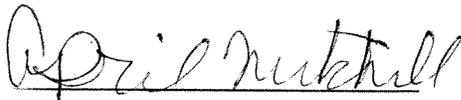
COUNTY OF SACRAMENTO

STATE OF CALIFORNIA

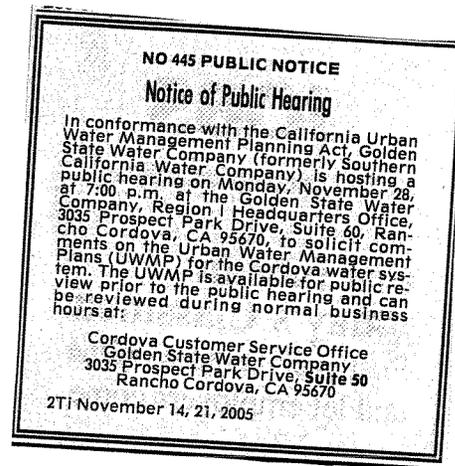
I am a citizen of the United States and a resident of the County aforesaid; I am over the age of eighteen years, and not a party to or interested in the above entitled matter. I am the printer and principal clerk of the publisher of The Sacramento Bee, printed and published in the City of Sacramento, County of Sacramento, State of California, daily, for which said newspaper has been adjudged a newspaper of general circulation by the Superior Court of the County of Sacramento, State of California, under the date of September 26, 1994, Action No. 879071; that the notice of which the annexed is a printed copy, has been published in each issue thereof and not in any supplement thereof on the following dates, to wit:

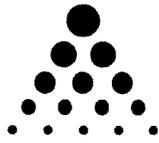
November 14, 21, 2005

I certify (or declare) under penalty of perjury that the foregoing is true and correct and that this declaration was executed at Sacramento, California, on November 21, 2005.



(Signature)





Golden State
WATER COMPANY
A Subsidiary of American States Water Company

Urban Water Management Plan: Cordova System

Public Hearing

Monday, November 28, 2005

Golden State Water Company Region 1 Headquarters

SIGN-IN SHEET

<u>Name</u>	<u>Company/Address</u>	<u>Phone Number</u>	<u>E-Mail</u>
Paul Schubert	G SWC	916-853-3636	
PAUL HARRIS	G SWC	916-635-1867 x11	
Michael Benson	G SWC	916-852-8563	
Kathy Lawson	G SWC	916-853-3638	

No Meeting Minutes were taken since there was no attendance by the public.

Appendix C
Public Comments on the Draft UWMP

No Public Comments received during Public Review Period.

Appendix D
Economic Analysis of Selected
Demand Management Measures

Arden-Cordova District Customer Service Area
Table D-1. Assumptions Used for Economic Analysis

BMP 1 – Water Survey Programs for Single-Family Residential and Multi-Family Residential Customers

Assumptions:

1. Survey 15% of single- and multi-family units within 10 years of the date implementation is to commence. Surveys will be conducted according to the following schedule: 1.5% by end of the first reporting period, 3.6% by end of second reporting period, 6.3% by end of third reporting period, 9.6% by end of fourth reporting period, and 15% by end of the fifth reporting period.

MOU, page 16 and page 17 Section E.d.

2. Single-family outdoor water usage = 188 gpd/unit

Single-family water usage was estimated by analyzing annual billing data. The monthly indoor water use is assumed to be equivalent to 60 percent of average monthly water use. Outdoor water is calculated as the difference between annual total use and the assumed annual indoor water use.

3. Multi-family outdoor water usage = 110 gpd/unit

Multi-family water usage was estimated by analyzing annual billing data. The monthly indoor water use is assumed to be equivalent to 70 percent of average monthly water use.

4. Water savings from indoor leak detection, not including toilet leaks = 4.1 gpd per residence

A & N Technical Services report (2003, page 2-38) (12.4 gpd per household repair; 33 percent of households audited have leaks – based on data from SCWC indoor leak detection program).

5. Water surveys decrease outdoor water use by 15%

MOU estimate is 10% (page 18).

6. Each water survey costs \$35.

The estimate includes marketing, contract labor, SCWC labor, overhead and materials. It is assumed that this BMP is done in conjunction with BMP2.

7. The life span of a water survey is four years.

A & N Technical Services report (2003, page 2-38) gives life spans for various components of a water survey. Four years selected as a reasonable average value..

8. Water savings from indoor plumbing retrofits are tracked under BMP 2. Only water savings from decrease in outdoor water use and water savings from indoor leak detection are tracked in BMP 1 to avoid double counting of water savings.

9. Energy Savings of \$42 per AF of water conserved.

Based on SCWC data.

**Arden-Cordova District Customer Service Area
Table D-1. Assumptions Used for Economic Analysis**

BMP 2 – Residential Plumbing Retrofit

Assumptions:

1. Plumbing retrofit devices will be installed at a minimum of 10% of residences per reporting period until it can be demonstrated that 75% of pre-1992 single-family residences and 75% of pre-1992 multi-family residences have low flow showerheads (LFSHs).

MOU, page 19.

2. 20% of single-family and 12% of multi-family residences have low-water-use fixtures.

Based on SCWC data

3. Average number of fixtures per residence includes: 2.0 showers, 2.0 toilets, and 4.0 faucets (1 kitchen faucet and 3 other faucets).

4. Water savings from one low-flow showerhead = 5.5 gpd

A & N Technical Services report (2003, page 2-38).

5. Water savings from one faucet aerator = 1.5 gpd

A & N Technical Services report (2003, page 2-38).

6. Water savings from one toilet flapper = 8 gpd; assume 20 percent of toilets leak.

A & N Technical Services report (2003, page 2-38).

7. Water savings from kitchen “flip” faucet aerator = 3.0 gpd.

Based on SCWC data.

8. Indoor water savings = 21.7 gpd/unit

We used the following equation to calculate indoor water savings, based on assumptions 4 through 8:

$$(2.0*5.5) + (1.0*3.0) + (3*1.5) + (2*8*0.20).$$

9. The BMP will cost an average of \$48 per residence.

Based on information provided by SCWC.

10. The life span of the retrofit devices is four years.

A & N Technical Services report (2003, page 2-38) gives life spans for a various components of a water survey. Four years selected as a reasonable average value.

11. Base year dwelling units include 9,410 single-family and 4,230 multi-family units.

**Arden-Cordova District Customer Service Area
Table D-1. Assumptions Used for Economic Analysis**

BMP 3 – System Water Audits, Leak Detection and Repair
<p>Assumptions:</p> <ol style="list-style-type: none">1. 20% of the distribution system will be surveyed and repaired each year.2. Leak repairs will result in annual savings of approximately 0.6 acre-feet of water per mile of pipe. Based on information provided by Golden State Water Company3. System water audits, leak detection and leak repair will cost approximately \$1000 per mile of pipe. Based on information provided by SCWC.

Arden-Cordova District Customer Service Area
Table D-1. Assumptions Used for Economic Analysis

BMP 4 – Retrofit of Existing Unmetered Connections
<p>Assumptions:</p> <ol style="list-style-type: none">1. Meter retrofits will result in a 20% reduction in demand MOU page 252. Average cost of meter equal to \$700 including installation labor and overhead Based on SCWC data.3. Annual estimate for meter reading \$12 Based on SCWC data.

**Arden-Cordova District Customer Service Area
Table D-1. Assumptions Used for Economic Analysis**

BMP 5 – Large Landscape Conservation Programs and Incentives

Assumptions:

1. Develop Eto-based water use budgets for 90 percent of the CII accounts with dedicated irrigation meters and provide irrigation water use surveys to 15 percent of CII accounts with mixed use meters.

MOU (Page 28)

2. Base year values include 360 dedicated landscape and 807 CII mixed use accounts.

Based on SCWC account summary data.

3. Dedicated landscape accounts are an average size of 1.7 acres

CII mixed use account landscape areas are assumed to be an average of 0.1 acre in size

4. Water use prior to the survey is 5.5 ft per year.

Irrigation allocation is equal to 100 percent of local evapotranspiration (ET_o), and the MOU estimates that surveys will reduce water usage by 15 percent. Based on California Irrigation Management Information System data.

5. Surveys will reduce water usage by 15%.

MOU, page 30.

6. The life span of the large landscape water surveys is four years.

A & N Technical Services report (2003) gives a life span of four years for turf audits (page 2-34). *Water surveys for large landscapes are assumed to have a similar life span.*

7. Each survey will cost \$425 per acre. Minimum cost is \$150 per account.

The estimate includes labor, administration, evaluation and overhead.

Arden-Cordova District Customer Service Area
Table D-1. Assumptions Used for Economic Analysis

BMP 6 – High-Efficiency Washing Machine Rebate Programs
<p>Assumptions</p> <ol style="list-style-type: none">1. Coverage Goal is equal to total (single- and multi-family) dwelling units x 0.048. MOU page 35.2. Each rebate will cost \$75. The MOU does not require implementation of this BMP if the maximum cost-effective rebate is less than \$50 (MOU, page 34). A \$50 rebate plus \$25 per rebate is assumed for program administration and overhead.3. Each high efficiency washing machine will reduce water usage by 6,200 gallons per year. MOU, page 38. Based on washing machines with water factor of 8.0.4. The life span of a high efficiency washing machine is 14 years. MOU, page 38.

Arden-Cordova District Customer Service Area
Table D-1. Assumptions Used for Economic Analysis

BMP 9 – Conservation Programs for Commercial, Industrial, and Institutional (CII) Accounts

Assumptions:

1. Provide water-use surveys to 10% of CII accounts within 10 years of the date implementation is to commence. *MOU, pages 43 and 44.*
2. The life span of a water survey is four years.

The life span for a CII water survey is the same as the life span for a residential survey.

3. The average annual water savings resulting from a commercial and institutional water survey is 0.83 acre-feet per account.

A & N Technical Services report (2003, page 2-51) gives average annual water savings for three types of surveys; "analyst surveys", "consultant surveys" and "water efficiency studies". Analyst surveys are conducted by non-engineers, consultant surveys are conducted by engineers for sites that have process water, and water efficiency studies are conducted at major industrial facilities that use very large quantities of water. For purposes of this economic analysis, only analyst surveys will be conducted for commercial and institutional account surveys. Values for water savings in the A & N report represent the maximum potential water savings that could occur if a customer were to implement every possible water conservation measure. Only 25% of the maximum potential water savings is assumed to be realized.

4. The average annual water savings resulting from an industrial water survey is 1.9 acre-feet per account.

For purposes of this economic analysis, consultant surveys will be conducted for industrial account surveys. Values for water savings in the A & N 2003 report represent the maximum potential water savings that could occur if a customer were to implement every possible water conservation measure. Only 25% of the maximum potential water savings is assumed to be realized.

5. Each analyst survey (for commercial and institutional accounts) will cost an average of \$600 and each consultant survey (for industrial accounts) will cost an average of \$1,500.

A & N Technical Services report (2003, page 2-53).

Arden-Cordova District Customer Service Area
Table D-1. Assumptions Used for Economic Analysis

BMP 14 – Residential ULFT Replacement Programs

Assumptions:

1. Water savings from ULFTs are 43.1 gpd/unit for single-family residences and 46.3 gpd/unit for multi-family residences

MOU, Exhibit 6, Table 1 and Table 2.

2. Homes constructed after 1991 already have ULFTs.

As of January 1992, California legislation requires that ULFTs be installed in all newly constructed homes.

3. Natural toilet replacement rate is 4% per year.

MOU, page 79.

4. The cost of toilets, advertising, administration, overhead, and toilet recycling is \$134 per ULFT. The cost does not include installation, which will be covered by the customer.

Based on SCWC cost data.

Arden Cordova District Customer Service Area
BMP 1. Water Survey Programs for Single-Family and Multi-Family Customers

Calendar Year	Water Saving Calculations								Benefits (\$)					Costs (\$)					New present Value
	Single Family Intervention	Multi-Family Intervention	Percent Units Surveyed	Single-Family Outdoor Savings (AF/yr)	Multi-Family Outdoor Savings (AF/yr)	Total Outdoor Savings (AF/yr)	Total Indoor Savings (AF/yr)	Annual Water Savings	Avoided Capital Costs	Avoided Variable Costs	Avoided Purchase Costs	Total Undiscounted Benefits	Total Discounted Benefits	Capital Costs	Financial Incentives	Operating Expenses	Total Undiscounted Costs	Total Discounted Costs	
Pre 2005	0	0	0.0%					0.0											
2006	778	317	7.5%	24.6	5.86	30.4	5.0	35.5	\$0	\$1,489	\$10,639	\$12,129	\$12,129	\$0	\$0	\$38,308	\$38,308	\$38,308	-\$26,179
2007	778	317	7.5%	24.6	5.86	30.4	5.0	70.9	\$0	\$2,979	\$21,278	\$24,257	\$22,732	\$0	\$0	\$38,308	\$38,308	\$35,899	-\$13,167
2008								70.9	\$0	\$2,979	\$21,278	\$24,257	\$21,303	\$0					\$21,303
2009								70.9	\$0	\$2,979	\$21,278	\$24,257	\$19,963	\$0					\$19,963
2010								35.5	\$0	\$1,489	\$10,639	\$12,129	\$9,354	\$0					\$9,354
2011																			
2012																			
2013																			
2014																			
2015																			
2016																			
2017																			
2018																			
2019																			
2020																			
2021																			
2022																			
2023																			
2024																			
2025																			
2026																			
2027																			
2028																			
2029																			
2030																			
Totals	1,555	634	15%	49	12	61	10	284	\$0	\$11,916	\$85,113	\$97,029	\$85,480	\$0	\$0	\$76,616	\$76,616	\$74,207	\$11,273

Credit Table for Previously Performed Surveys					
Year	Single Family Units Surveyed	Multi-Family Units Surveyed	% Credit	Single Family Credits	Multi-Family Credits
Pre-1990			0.0%	0	0
1990			12.5%	0	0
1991			25.0%	0	0
1992			37.5%	0	0
1993			50.0%	0	0
1994			62.5%	0	0
1995			75.0%	0	0
1996			87.5%	0	0
1997			100.0%	0	0
1998-2004			100.0%	0	0
Total	0	0		0	0

Value of conserved water (\$/AF) = 300 Discount rate (real) = 6.71% Indoor water savings (gpd/unit) = 4.1 Outdoor water savings = 15% Single family outdoor water usage (gpd/unit) = 188 Multi-family outdoor water usage (gpd/unit) = 110 Conservation measure unit cost (\$) = 35 1997 Single family units = 10,364 1997 Multi-family units = 4,227 Life span of water survey (years) = 4 Energy savings \$/AF = 42	Benefit cost ratio = 1.2 Simple pay-back period (years) = 4 Discounted cost/water saved (\$acre-feet) = 262 NPV/ water saved (acre-feet) = 40
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Arden Cordova District Customer Service Area
BMP 2. Residential Plumbing Retrofit

Calendar Year	Water Saving Calculations						Benefits (\$)					Costs (\$)					New present Value	
	Single-Family Intervention	Multi-Family Intervention	Percent Units Surveyed Single-Family	Percent Units Surveyed Multi-Family	Incremental Water Savings (AF/yr)	Annual Water Savings	Avoided Capital Costs	Avoided Variable Costs	Avoided Purchase Costs	Total Undiscounted Benefits	Total Discounted Benefits	Capital Costs	Financial Incentives	Operating Expenses	Total Undiscounted Costs	Total Discounted Costs		
Pre 2005			20%	12%														
2006	470	211	5.0%	5.0%	16.6	16.6	\$0	\$696	\$4,972	\$5,668	\$5,668	\$0	\$0	\$32,734	\$32,734	\$32,734	-\$27,066	
2007	470	211	5.0%	5.0%	16.6	33.1	\$0	\$1,392	\$9,944	\$11,337	\$10,624	\$0	\$0	\$32,734	\$32,734	\$30,676	-\$20,052	
2008	470	211	5.0%	5.0%	16.6	49.7	\$0	\$2,088	\$14,917	\$17,005	\$14,934	\$0	\$0	\$32,734	\$32,734	\$28,747	-\$13,813	
2009	470	211	5.0%	5.0%	16.6	66.3	\$0	\$2,784	\$19,889	\$22,673	\$18,659	\$0	\$0	\$32,734	\$32,734	\$26,939	-\$8,280	
2010	470	211	5.0%	5.0%	16.6	66.3	\$0	\$2,784	\$19,889	\$22,673	\$17,486	\$0	\$0	\$32,734	\$32,734	\$25,245	-\$7,759	
2011	470	211	5.0%	5.0%	16.6	66.3	\$0	\$2,784	\$19,889	\$22,673	\$16,387	\$0	\$0	\$32,734	\$32,734	\$23,658	-\$7,271	
2012	470	211	5.0%	5.0%	16.6	66.3	\$0	\$2,784	\$19,889	\$22,673	\$15,356	\$0	\$0	\$32,734	\$32,734	\$22,170	-\$6,814	
2013	470	211	5.0%	5.0%	16.6	66.3	\$0	\$2,784	\$19,889	\$22,673	\$14,391	\$0	\$0	\$32,734	\$32,734	\$20,776	-\$6,386	
2014	470	211	5.0%	5.0%	16.6	66.3	\$0	\$2,784	\$19,889	\$22,673	\$13,486	\$0	\$0	\$32,734	\$32,734	\$19,470	-\$5,984	
2015	470	211	5.0%	5.0%	16.6	66.3	\$0	\$2,784	\$19,889	\$22,673	\$12,638	\$0	\$0	\$32,734	\$32,734	\$18,245	-\$5,608	
2016	470	211	5.0%	5.0%	16.6	66.3	\$0	\$2,784	\$19,889	\$22,673	\$11,843	\$0	\$0	\$32,734	\$32,734	\$17,098	-\$5,255	
2017	0	211	0.0%	5.0%	5.1	54.9	\$0	\$2,304	\$16,459	\$18,763	\$9,184	\$0	\$0	\$10,151	\$10,151	\$4,969	\$4,215	
2018	0	127	0.0%	3.0%	3.1	41.4	\$0	\$1,738	\$12,411	\$14,149	\$6,490	\$0	\$0	\$6,091	\$6,091	\$2,794	\$3,696	
2019					0.0	24.8	\$0	\$1,041	\$7,439	\$8,481	\$3,646	\$0	\$0	\$0	\$0	\$0	\$0	\$3,646
2020					0.0	8.2	\$0	\$345	\$2,467	\$2,812	\$1,133	\$0	\$0	\$0	\$0	\$0	\$0	\$1,133
2021					0.0	3.1	\$0	\$130	\$925	\$1,055	\$398	\$0	\$0	\$0	\$0	\$0	\$0	\$398
2022																		
2023																		
2024																		
2025																		
2026																		
2027																		
2028																		
2029																		
2030																		
Totals	5175	2665	75%	75%	191	762	\$0	\$32,010	\$228,645	\$260,656	\$172,322	\$0	\$0	\$376,317	\$376,317	\$273,522	-\$101,199	

Percent of Residences Having Low-Water-Use Fixtures			Value of conserved water (\$/AF) (=			Benefit cost ratio =		
Year	Single-Family	Multi-Family	Value of conserved water (\$/AF) (=	Discount rate (real) =	Water savings (gpd/unit) =	Benefit cost ratio =	Simple pay-back period (years) =	Discounted cost/water saved (\$acre-feet) =
Pre-2006	20%	12%	300	6.71%	21.7	0.63	25	359
Annual Replacement			Conservation measure unit cost (\$) = 48		Percent units receiving retrofits = 5%			NPV/ water saved (acre-feet) = -133
2006	5%	5%	1991 Single family units = 9,410		Life span of retrofit devices (years) = 4			
2007	5%	5%	1991 Multi-family units = 4,230		Energy savings \$/AF = 42			
2008	5%	5%						
2009	5%	5%						
2010	5%	5%						
2011	5%	5%						
2012	5%	5%						
2013	5%	5%						
2014	5%	5%						
2015	5%	5%						
2016	5%	5%						
2017	0%	5%						
2018	0%	3%						
2019	0%	0%						

Arden Cordova District Customer Service Area
BMP 3. System Water Audits, Leak Detection, and Repair

Calendar Year	Water Savings		Benefits (\$)					Costs (\$)					New present Value																
	Length of Pipe Surveyed (miles)	Annual Water Savings	Avoided Capital Costs	Avoided Variable Costs	Avoided Purchase Costs	Total Undiscounted Benefits	Total Discounted Benefits	Capital Costs	Financial Incentives	Operating Expenses	Total Undiscounted Costs	Total Discounted Costs																	
Pre 1998																													
2006	20.6	12.4	\$0	\$519	\$3,708	\$4,227	\$4,227	\$0	\$0	\$20,600	\$20,600	\$20,600	-\$16,373																
2007	20.6	24.7	\$0	\$1,038	\$7,416	\$8,454	\$7,923	\$0	\$0	\$20,600	\$20,600	\$19,305	-\$11,382																
2008	20.6	37.1	\$0	\$1,557	\$11,124	\$12,681	\$11,137	\$0	\$0	\$20,600	\$20,600	\$18,091	-\$6,954																
2009	20.6	49.4	\$0	\$2,076	\$14,832	\$16,908	\$13,915	\$0	\$0	\$20,600	\$20,600	\$16,953	-\$3,038																
2010	20.6	61.8	\$0	\$2,596	\$18,540	\$21,136	\$16,300	\$0	\$0	\$20,600	\$20,600	\$15,887	\$413																
2011	20.6	61.8	\$0	\$2,596	\$18,540	\$21,136	\$15,275	\$0	\$0	\$20,600	\$20,600	\$14,888	\$387																
2012	20.6	61.8	\$0	\$2,596	\$18,540	\$21,136	\$14,315	\$0	\$0	\$20,600	\$20,600	\$13,952	\$363																
2013	20.6	61.8	\$0	\$2,596	\$18,540	\$21,136	\$13,415	\$0	\$0	\$20,600	\$20,600	\$13,075	\$340																
2014	20.6	61.8	\$0	\$2,596	\$18,540	\$21,136	\$12,571	\$0	\$0	\$20,600	\$20,600	\$12,253	\$319																
2015	20.6	61.8	\$0	\$2,596	\$18,540	\$21,136	\$11,781	\$0	\$0	\$20,600	\$20,600	\$11,482	\$299																
2016	20.6	61.8	\$0	\$2,596	\$18,540	\$21,136	\$11,040	\$0	\$0	\$20,600	\$20,600	\$10,760	\$280																
2017	20.6	61.8	\$0	\$2,596	\$18,540	\$21,136	\$10,346	\$0	\$0	\$20,600	\$20,600	\$10,083	\$262																
2018	20.6	61.8	\$0	\$2,596	\$18,540	\$21,136	\$9,695	\$0	\$0	\$20,600	\$20,600	\$9,449	\$246																
2019	20.6	61.8	\$0	\$2,596	\$18,540	\$21,136	\$9,085	\$0	\$0	\$20,600	\$20,600	\$8,855	\$230																
2020	20.6	61.8	\$0	\$2,596	\$18,540	\$21,136	\$8,514	\$0	\$0	\$20,600	\$20,600	\$8,298	\$216																
2021	20.6	61.8	\$0	\$2,596	\$18,540	\$21,136	\$7,979	\$0	\$0	\$20,600	\$20,600	\$7,777	\$202																
2022	20.6	61.8	\$0	\$2,596	\$18,540	\$21,136	\$7,477	\$0	\$0	\$20,600	\$20,600	\$7,288	\$189																
2023	20.6	61.8	\$0	\$2,596	\$18,540	\$21,136	\$7,007	\$0	\$0	\$20,600	\$20,600	\$6,829	\$178																
2024	20.6	61.8	\$0	\$2,596	\$18,540	\$21,136	\$6,566	\$0	\$0	\$20,600	\$20,600	\$6,400	\$166																
2025	20.6	61.8	\$0	\$2,596	\$18,540	\$21,136	\$6,153	\$0	\$0	\$20,600	\$20,600	\$5,997	\$156																
2026	20.6	61.8	\$0	\$2,596	\$18,540	\$21,136	\$5,766	\$0	\$0	\$20,600	\$20,600	\$5,620	\$146																
2027	20.6	61.8	\$0	\$2,596	\$18,540	\$21,136	\$5,404	\$0	\$0	\$20,600	\$20,600	\$5,267	\$137																
2028	20.6	61.8	\$0	\$2,596	\$18,540	\$21,136	\$5,064	\$0	\$0	\$20,600	\$20,600	\$4,936	\$128																
2029	20.6	61.8	\$0	\$2,596	\$18,540	\$21,136	\$4,746	\$0	\$0	\$20,600	\$20,600	\$4,625	\$120																
2030	20.6	61.8	\$0	\$2,596	\$18,540	\$21,136	\$4,447	\$0	\$0	\$20,600	\$20,600	\$4,335	\$113																
Totals	515	1,421	\$0	\$59,699	\$426,420	\$486,119	\$230,149	\$0	\$0	\$515,000	\$515,000	\$263,006	-\$32,858																
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">Value of conserved water (\$/AF) = 300</td> <td style="width: 50%;">Benefit cost ratio = 0.9</td> </tr> <tr> <td>Discount rate (real) = 6.71%</td> <td>Simple pay-back period (years) = 22</td> </tr> <tr> <td>Annual water savings (AF/mile) = 0.6</td> <td>Discounted cost/water saved (\$/acre-foot) = 185</td> </tr> <tr> <td>Conservation measure unit cost (\$) = 1000</td> <td>NPV/ water saved (acre-feet) = -23</td> </tr> <tr> <td>Percent of pipe surveyed = 20%</td> <td></td> </tr> <tr> <td>Total length of pipe in system (miles) = 103</td> <td></td> </tr> <tr> <td>Life span of leak repairs (years) = 5</td> <td></td> </tr> <tr> <td>Energy savings \$/AF = 42</td> <td></td> </tr> </table>														Value of conserved water (\$/AF) = 300	Benefit cost ratio = 0.9	Discount rate (real) = 6.71%	Simple pay-back period (years) = 22	Annual water savings (AF/mile) = 0.6	Discounted cost/water saved (\$/acre-foot) = 185	Conservation measure unit cost (\$) = 1000	NPV/ water saved (acre-feet) = -23	Percent of pipe surveyed = 20%		Total length of pipe in system (miles) = 103		Life span of leak repairs (years) = 5		Energy savings \$/AF = 42	
Value of conserved water (\$/AF) = 300	Benefit cost ratio = 0.9																												
Discount rate (real) = 6.71%	Simple pay-back period (years) = 22																												
Annual water savings (AF/mile) = 0.6	Discounted cost/water saved (\$/acre-foot) = 185																												
Conservation measure unit cost (\$) = 1000	NPV/ water saved (acre-feet) = -23																												
Percent of pipe surveyed = 20%																													
Total length of pipe in system (miles) = 103																													
Life span of leak repairs (years) = 5																													
Energy savings \$/AF = 42																													

Arden Cordova District Customer Service Area
BMP 4. Retrofit Existing Unmetered Connections

Calendar Year	Water Savings Calculations					Benefits (\$)					Costs (\$)					Net Present Value																																																																								
	Single-family Units Metered	Multi-family Units Metered	Number of Meters Installed	Incremental Water Savings	Annual Water Savings	Avoided Capital Costs	Avoided Variable Costs	Avoided Purchase Costs	Total Undiscounted Benefits	Total Discounted Benefits	Capital Costs	Financial Incentives	Operating Expenses	Total Undiscounted Costs	Total Discounted Costs																																																																									
2006	1,100	427	1,185	151	151		6,340	45,286	53,539	53,539	829,556		14,221	843,777	843,777	-790,237																																																																								
2007	1,100	427	1,185	151	302		12,680	90,571	105,316	98,694	829,556		28,442	857,998	804,046	-705,353																																																																								
2008	1,100	427	1,185	151	453		19,020	135,857	157,093	137,958	829,556		42,663	872,219	765,976	-628,019																																																																								
2009	1,100	427	1,185	151	604		25,360	181,142	208,869	171,893	829,556		56,884	886,440	729,514	-557,621																																																																								
2010	1,100	427	1,185	151	755		31,700	226,428	260,646	201,016	829,556		71,105	900,661	694,610	-493,594																																																																								
2011	1,100	427	1,185	151	906		38,040	271,714	312,422	225,796	829,556		85,326	914,882	661,210	-435,414																																																																								
2012	1,100	427	1,185	151	1,057		44,380	316,999	364,199	246,665	829,556		99,547	929,103	629,264	-382,599																																																																								
2013	1,100	427	1,185	151	1,208		50,720	362,285	415,975	264,017	829,556		113,768	943,324	598,722	-334,705																																																																								
2014	1,100	427	1,185	151	1,359		57,060	407,571	467,752	278,211	829,556		127,989	957,545	569,532	-291,321																																																																								
2015	1,100	427	1,185	151	1,510		63,400	452,856	519,528	289,576	829,556		142,210	971,766	541,646	-252,069																																																																								
2016					1,510		63,400	452,856	517,766	270,447	0		142,210	142,210	74,281	196,166																																																																								
2017					1,510		63,400	452,856	517,766	253,441	0		142,210	142,210	69,610	183,831																																																																								
2018					1,510		63,400	452,856	517,766	237,504	0		142,210	142,210	65,233	172,271																																																																								
2019					1,510		63,400	452,856	517,766	222,570	0		142,210	142,210	61,131	161,439																																																																								
2020					1,510		63,400	452,856	517,766	208,575	0		142,210	142,210	57,287	151,287																																																																								
2021					1,510		63,400	452,856	517,766	195,459	0		142,210	142,210	53,685	141,774																																																																								
2022					1,510		63,400	452,856	517,766	183,169	0		142,210	142,210	50,309	132,860																																																																								
2023					1,510		63,400	452,856	517,766	171,651	0		142,210	142,210	47,146	124,505																																																																								
2024					1,510		63,400	452,856	517,766	160,857	0		142,210	142,210	44,181	116,676																																																																								
2025					1,510		63,400	452,856	517,766	150,743	0		142,210	142,210	41,403	109,340																																																																								
2026																																																																																								
2027																																																																																								
2028																																																																																								
2029																																																																																								
2030																																																																																								
Totals	10,997	4269.0	11,851	1,510	23,398		982,698	7019270	8,042,995	4,021,781	8,295,560	0	2,204,249	10,499,809	7,402,563	-3,380,782																																																																								
<table style="width: 100%; border: none;"> <tr> <td style="width: 30%;"></td> <td style="width: 30%;">Value of conserved water (\$/AF) =</td> <td style="width: 10%;">300</td> <td style="width: 30%;"></td> <td style="width: 10%;">Benefit cost ratio =</td> <td style="width: 10%;">0.5</td> </tr> <tr> <td></td> <td>Discount rate (real) =</td> <td>6.71%</td> <td></td> <td>Simple pay-back period (years) =</td> <td>37</td> </tr> <tr> <td></td> <td>Single-family unmetered units in year 2005 =</td> <td>10997</td> <td></td> <td>Discounted cost/water saved (\$acre-feet) =</td> <td>316</td> </tr> <tr> <td></td> <td>Multi-family unmetered units in year 2005 =</td> <td>4269</td> <td></td> <td>NPV/ water saved (acre-feet) =</td> <td>-144</td> </tr> <tr> <td style="text-align: center;">426628.8</td> <td>Single-family water usage =</td> <td>470</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>Multi-family water usage =</td> <td>367</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>Number of multi-family units served by one meter =</td> <td>5</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>Water saver per unit =</td> <td>20%</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>Unit cost of meter =</td> <td>700</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>Annual cost of meter reading =</td> <td>12</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>Lifespan of Benefit (years) =</td> <td>20</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>Energy savings \$/AF =</td> <td>42</td> <td></td> <td></td> <td></td> </tr> </table>																		Value of conserved water (\$/AF) =	300		Benefit cost ratio =	0.5		Discount rate (real) =	6.71%		Simple pay-back period (years) =	37		Single-family unmetered units in year 2005 =	10997		Discounted cost/water saved (\$acre-feet) =	316		Multi-family unmetered units in year 2005 =	4269		NPV/ water saved (acre-feet) =	-144	426628.8	Single-family water usage =	470					Multi-family water usage =	367					Number of multi-family units served by one meter =	5					Water saver per unit =	20%					Unit cost of meter =	700					Annual cost of meter reading =	12					Lifespan of Benefit (years) =	20					Energy savings \$/AF =	42			
	Value of conserved water (\$/AF) =	300		Benefit cost ratio =	0.5																																																																																			
	Discount rate (real) =	6.71%		Simple pay-back period (years) =	37																																																																																			
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	Annual cost of meter reading =	12																																																																																						
	Lifespan of Benefit (years) =	20																																																																																						
	Energy savings \$/AF =	42																																																																																						

Arden Cordova District Customer Service Area
BMP 5. Large Landscape Conservation Programs and Incentives

Calendar Year	Water Saving Calculations						Benefits					Costs				Net Present Value	
	CII Accounts w/Dedicated Irr. Meters Interventions	CII Accounts w/Mixed Use Meters Offered Surveys	CII Accounts w/Mixed Use Meters % Surveyed	CII Accounts w/Mixed Use Meters Interventions	Incremental Water Savings (AF/Yr)	Cumulative Water Savings (AF/Yr)	Avoided Capital Costs	Avoided Variable Costs	Avoided Purchase Costs	Total Undiscounted Benefits	Total Discounted Benefits	Capital Costs	Financial Incentives	Operating Expenses	Total Undiscounted Costs		Total Discounted Costs
2005	0	0	0.00%	0	0	0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
2006	162	81	4.80%	39	230	230	\$0	\$9,677	\$69,120	\$78,797	\$73,842	\$0	\$0	\$122,855	\$122,855	\$115,130	-\$41,288
2007	162	81	4.80%	39	230	461	\$0	\$19,354	\$138,240	\$157,594	\$138,398	\$0	\$0	\$122,855	\$122,855	\$107,891	\$30,507
2008	0	81	1.95%	16	1	462	\$0	\$19,408	\$138,630	\$158,038	\$130,061	\$0	\$0	\$2,360	\$2,360	\$1,943	\$128,118
2009	0	81	1.95%	16	1	463	\$0	\$19,463	\$139,019	\$158,482	\$122,225	\$0	\$0	\$2,360	\$2,360	\$1,820	\$120,404
2010		81	0.75%	6	0	233	\$0	\$9,807	\$70,049	\$79,856	\$57,714	\$0	\$0	\$908	\$908	\$656	\$57,058
2011		81	0.75%	6	0	4	\$0	\$151	\$1,079	\$1,230	\$833	\$0	\$0	\$908	\$908	\$615	\$218
2012		81	0.00%	0	0	2	\$0	\$96	\$689	\$786	\$499	\$0	\$0	\$0	\$0	\$0	\$499
2013		81	0.00%	0	0	1	\$0	\$42	\$300	\$342	\$203	\$0	\$0	\$0	\$0	\$0	\$203
2014		81	0.00%	0	0	0	\$0	\$21	\$150	\$171	\$95	\$0	\$0	\$0	\$0	\$0	\$95
2015																	
2016																	
2017																	
2018																	
2019																	
2020																	
2021																	
2022																	
2023																	
2024																	
2025																	
2026																	
2027																	
2028																	
2029																	
2030																	
Totals:	324	726	15%	121	464	1,858	\$0	\$78,019	\$557,276	\$635,295	\$523,870	\$0	\$0	\$252,248	\$252,248	\$228,055	\$295,815

Year	# of Surveys	% Credit	Credits
Prior to 7/1/96 with follow up inspection		100%	0
Prior to 7/1/96 without follow up inspection		50%	0
After 7/1/96		100%	0
TOTAL			0

Value of Conserved Water (\$/AF) = \$300
Discount Rate (Real) = 6.71%
Acres/CII accounts with dedicated irrigation meters = 1.7
Acres/CII accounts with mixed use meters = 0.1
Annual water use (ac-ft/acre) = 5.5
Water Savings = 15%
Conservation Measure Unit Cost (\$/Acre) = \$425
Minimum Conservation Measure Unit Cost (\$/Account) = \$150
Number of CII accounts with dedicated irrigation meters in 1997 = 360
Number of CII accounts with mixed use meters in 1997 = 807
Lifespan of Benefit (Years) = 4
Energy savings \$/AF = 42

Benefit Cost Ratio: 2.3
Simple Pay-Back Period (years): 2
Discounted Cost / Water Saved (\$/AF): \$123
NPV / Water Saved (\$/AF): \$159

Arden Cordova District Customer Service Area
 BMP 9. Conservation Programs for Commercial, Industrial, and Institutional (CII) Accounts

Calendar Year	Percent Surveyed	Commercial Interventions	Industrial Interventions	Institutional Interventions	Incremental Savings (Surveys) (AF/yr)		Annual Savings Total (AF/yr)	Benefits (\$)					Costs (\$)					Net Present Value		
								Avoided Capital Costs	Avoided Variable Costs	Avoided Purchase Costs	Total Undiscounted Benefits	Total Discounted Benefits	Capital Costs	Financial Incentives	Operating Expenses	Total Undiscounted Costs	Total Discounted Costs			
Pre 1998				0																
2006	5.00%	32.7	1.75	5.9	35.7	35.7	35.7	\$0	\$1,500	\$10,714	\$12,214	\$12,214	\$0	\$0	\$25,785	\$25,785	\$25,785	\$25,785	-\$13,571	
2007	5.00%	32.7	1.75	5.9	35.7	35.7	71.4	\$0	\$3,000	\$21,428	\$24,428	\$22,892	\$0	\$0	\$25,785	\$25,785	\$24,164	\$24,164	-\$1,272	
2008							71.4	\$0	\$3,000	\$21,428	\$24,428	\$21,452	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$21,452
2009							71.4	\$0	\$3,000	\$21,428	\$24,428	\$20,103	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$20,103
2010							35.7	\$0	\$1,500	\$10,714	\$12,214	\$9,420	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$9,420
2011																				
2012																				
2013																				
2014																				
2015																				
2016																				
2017																				
2018																				
2019																				
2020																				
2021																				
2022																				
2023																				
2024																				
2025																				
2026																				
2027																				
2028																				
2029																				
2030																				
Totals	10%	65	4	12	71		286	\$0	\$12,000	\$85,711	\$97,711	\$86,081	\$0	\$0	\$51,570	\$51,570	\$49,949	\$49,949	\$36,132	

Credit for Previously Completed Surveys			
	Commercial	Industrial	Institutional
Total	0	0	0

Value of conserved water (\$/AF) = 300	Benefit cost ratio = 1.7
Discount rate (real) = 6.71%	Simple pay-back period (years) = 3
Annual survey - Annual water savings (AF/unit) = 0.83	Discounted cost/water saved (\$acre-feet) = 175
Annual survey - Conservation measure unit cost (\$) = 600	NPV/ water saved (acre-feet) = 126
Consultant survey - Annual water savings (AF/unit) = 2.1	
Consultant survey - Conservation measure unit cost (\$) = 1500	
Number of commercial accounts in 1997 = 654	
Number of industrial accounts in 1997 = 35	
Number of institutional accounts in 1997 = 118	
Percent units surveyed = 10%	
Life span of water survey (years) = 4	
Energy savings \$/AF = 42	

Arden Cordova District Customer Service Area
 BMP 14. Residential ULFT Replacement Programs (page 1 of 3)

Determination of Water Conservation Goal: Single-Family Units											
Calendar Year	Single-Family Units	SF Units Naturally Retrofitted	SF Toilets Naturally Retrofitted	Water Savings from Natural Replacement SF (AF/yr)	Single-Family Units	Single-Family Retrofitted	Single-Family Turnover	Combined SF Homes Retrofitted	Combined SF Toilets Retrofitted	Water Savings from Natural Replacement and Turnover SF (AF/yr)	Water Savings from Natural Turnover SF (AF/yr)
1998	7071	0	0	0	7071	0	0	0	0	0	0
1999	6788	283	707	14	6562	283	226	509	1,273	24.6	11
2000	6516	272	679	13	6089	262	210	472	1,181	22.8	10
2001	6256	261	652	13	5651	244	195	438	1,096	21.2	9
2002	6006	250	626	12	5244	226	181	407	1,017	19.6	8
2003	5765	240	601	12	4866	210	168	378	944	18.2	7
2004	5535	231	577	11	4516	195	156	350	876	16.9	6
2005	5313	221	553	11	4191	181	145	325	813	15.7	5
2006	5101	213	531	10	3889	168	134	302	754	14.6	4
2007	4897	204	510	10	3609	156	124	280	700	13.5	4
2008	4701	196	490	9	3349	144	115	260	650	12.5	3
2009	4513	188	470	9	3108	134	107	241	603	11.6	3
2010	4332	181	451	9	2884	124	99	224	559	10.8	2
2011	4159	173	433	8	2677	115	92	208	519	10.0	2
2012	3993	166	416	8	2484	107	86	193	482	9.3	1
2013	3833	160	399	8	2305	99	79	179	447	8.6	1
2014	3680	153	383	7	2139	92	74	166	415	8.0	1
2015	3532	147	368	7	1985	86	68	154	385	7.4	0
2016	3391	141	353	7	1842	79	64	143	357	6.9	0
2017	3256	136	339	7	1710	74	59	133	332	6.4	0
2018	3125	130	326	6	1586	68	55	123	308	5.9	0
2019	3000	125	313	6	1472	63	51	114	286	5.5	0
Totals		4,071	10,176	196		3,110		5,599	13,996	270	75

Credit Table for Previously Installed ULFT				
Year	Single-Family	Multi-Family	Incremental Savings	Cummulative Savings
1996	545		11	11
1997	714		14	24
1998			0	24
1999			0	24
2000	8		0	24
2001			0	24
2002	50	50	3	27
2003	30	10	1	28
2004	50	50	3	31
Total	1397	110	31	218

Arden Cordova District Customer Service Area
BMP 14. Residential ULFT Replacement Program (page 2 of 3)

Calendar Year	Determination of Water Conservation Goal: Multi-Family Units											Conservation Goal - Combined			
	Multi-Family Units	MF Units Naturally Retrofitted	MF Toilets Naturally Retrofitted	Water Savings from Natural Replacement MF (AF/yr)	Multi-Family Units	MF Units Naturally Retrofitted	Multi-Family Turnover	Combined MF Homes Retrofitted	Combined MF Toilets Retrofitted	Water Savings from Natural Replacement and Turnover	Water Savings from Natural Turnover MF (AF/yr)		Annual Water Savings from Turnover (AF/yr)		Cummulative Water Savings from Turnover (AF/yr)
1998	3178	0	0	0	3178	0	0	0	0	0	0	0	0	0	0
1999	3051	127	191	7	3048	127	3	130	195	6.8	0	11	11	11	11
2000	2929	122	183	6	2923	122	3	125	187	6.5	0	10	21	21	32
2001	2812	117	176	6	2803	117	3	120	180	6.2	0	9	30	30	62
2002	2700	112	169	6	2688	112	3	115	172	6.0	0	8	37	37	99
2003	2592	108	162	6	2578	108	3	110	165	5.7	0	7	44	44	143
2004	2488	104	155	5	2472	103	3	106	159	5.5	0	6	50	50	193
2005	2388	100	149	5	2371	99	2	101	152	5.3	0	5	55	55	248
2006	2293	96	143	5	2274	95	2	97	146	5.0	0	4	59	59	308
2007	2201	92	138	5	2181	91	2	93	140	4.8	0	4	63	63	371
2008	2113	88	132	5	2091	87	2	89	134	4.6	0	3	66	66	437
2009	2029	85	127	4	2005	84	2	86	129	4.4	0	3	69	69	506
2010	1947	81	122	4	1923	80	2	82	123	4.3	0	2	71	71	577
2011	1870	78	117	4	1844	77	2	79	118	4.1	0	2	73	73	650
2012	1795	75	112	4	1769	74	2	76	113	3.9	0	1	74	74	724
2013	1723	72	108	4	1696	71	2	73	109	3.8	0	1	75	75	800
2014	1654	69	103	4	1627	68	2	70	104	3.6	0	1	76	76	875
2015	1588	66	99	3	1560	65	2	67	100	3.5	0	0	76	76	952
2016	1524	64	95	3	1496	62	2	64	96	3.3	0	0	76	76	1028
2017	1463	61	91	3	1435	60	1	61	92	3.2	0	0	76	76	1104
2018	1405	59	88	3	1376	57	1	59	88	3.1	0	0	76	76	1180
2019	1349	56	84	3	1319	55	1	56	85	2.9	0	0	76	76	1257
Totals	47,091	1830	2745	94.9		1,814		1,859	2,788	96	1.5		1,257		11,558

Arden Cordova District Customer Service Area
BMP 14. Residential ULFT Replacement Programs (page 3 of 3)

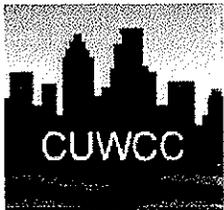
Calendar Year	Water Savings							Benefits (\$)					Costs (\$)					Net Present Value
	No. of SF Toilets Required to be Replaced	Incremental Water Savings SF (AF/yr)	No. of MF Toilets Required to be Replaced	Incremental Water Savings (AF/yr)	Annual Water Savings (AF/yr)	Incremental Total Water Savings (AF/yr)	Cumulative Total Water Savings (AF/yr)	Avoided Capital Costs	Avoided Variable Costs	Avoided Purchase Costs	Total Undiscounted Benefits	Total Discounted Benefits	Capital Costs	Financial Incentives	Operating Expenses	Total Undiscounted Costs	Total Discounted Costs	
Pre 2005	1397	27	110	4	31	31	218	0	1,293	9,235	10,528	10,528	0	0	201,938	201,938	201,938	-191,410
2005	403	8	202	7	46	46	264	0	1,912	13,659	15,572	15,572	0	0	81,003	81,003	81,003	-65,431
2006	403	8	202	7	60	60	324	0	2,532	18,084	20,616	19,319	0	0	81,003	81,003	75,909	-56,590
2007	403	8	202	7	75	75	399	0	3,151	22,509	25,660	22,534	0	0	81,003	81,003	71,136	-48,602
2008	403	8	202	7	90	90	489	0	3,771	26,933	30,704	25,268	0	0	81,003	81,003	66,663	-41,395
2009						90	579	0	3,771	26,933	30,704	23,680	0	0	0	0	0	23,680
2010						90	669	0	3,771	26,933	30,704	22,191	0	0	0	0	0	22,191
2011						90	758		3,771	26,933	30,704	20,795	0	0	0	0	0	20,795
2012						90	848		3,771	26,933	30,704	19,488	0	0	0	0	0	19,488
2013						90	938		3,771	26,933	30,704	18,262	0	0	0	0	0	18,262
2014						90	1028		3,771	26,933	30,704	17,114	0	0	0	0	0	17,114
2015						90	1118		3,771	26,933	30,704	16,038	0	0	0	0	0	16,038
2016						90	1207		3,771	26,933	30,704	15,029	0	0	0	0	0	15,029
2017						90	1297		3,771	26,933	30,704	14,084	0	0	0	0	0	14,084
2018						90	1387		3,771	26,933	30,704	13,199	0	0	0	0	0	13,199
2019						90	1477		3,771	26,933	30,704	12,369	0	0	0	0	0	12,369
2020						90	1566		3,771	26,933	30,704	11,591	0	0	0	0	0	11,591
2021						90	1656		3,771	26,933	30,704	10,862	0	0	0	0	0	10,862
2022						90	1746		3,771	26,933	30,704	10,179	0	0	0	0	0	10,179
2023						90	1836		3,771	26,933	30,704	9,539	0	0	0	0	0	9,539
2024						90	1926		3,771	26,933	30,704	8,939	0	0	0	0	0	8,939
2025						90	2015		3,771	26,933	30,704	8,377	0	0	0	0	0	8,377
2026						90	2105		3,771	26,933	30,704	7,850	0	0	0	0	0	7,850
2027						90	2195		3,771	26,933	30,704	7,357	0	0	0	0	0	7,357
2028						90	2285		3,771	26,933	30,704	6,894	0	0	0	0	0	6,894
2029						90	2374		3,771	26,933	30,704	6,461	0	0	0	0	0	6,461
2030						90	2464		3,771	26,933	30,704	6,054	0	0	0	0	0	6,054
Totals	0.0	0		0.0	301.4	2276.5	35,168	0	95,613	682,952	778,566	379,572	0	0	525,950	525,950	496,650	-117,078
<p style="text-align: center;">Value of conserved water (\$/AF) (= 300 Discount rate (real) = 6.71% Natural toilet replacement rate = 4% Annual single-family housing turnover rate = 3.2% Annual multi-family housing turnover rate = 0.1% Water savings due to toilet replacement at SF homes (gal/dwelling unit/day = 43.1 Water savings due to toilet replacement at MF homes (gal/dwelling unit/day = 46.3 Number of toilets per SF home = 2.5 Number of toilets per MF home = 1.5 Cost of conservation measure = 134 1991 single-family units = 9,410 1991 multi-family units = 4,230 Energy savings \$/AF = 42</p> <p style="text-align: right;">Benefit cost ratio = 0.8 Simple pay-back period (years) = 31 Discounted cost/water saved (\$acre-feet) = 218 NPV/ water saved (acre-feet) = -51</p>																		

Appendix E
Council Annual Reports for
Demand Management Measures

CUWCC

Arden-Cordova

Annual Report 2004



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Reporting Unit:

**So. California Water Company - Arden
Cordova District**

Year:

2004

The following forms have been submitted to CUWCC as of February 27, 2005 for the year 2004:

Accounts and Water Use

BMP 01: Water Survey Programs for Single-Family and Multi-Family Residential Customers

BMP 02: Residential Plumbing Retrofit

BMP 03: System Water Audits, Leak Detection and Repair

BMP 04: Metering with Commodity Rates for all New Connections and Retrofit of Existing

BMP 05: Large Landscape Conservation Programs and Incentives

BMP 06: High-Efficiency Washing Machine Rebate Programs

BMP 07: Public Information Programs

BMP 08: School Education Programs

BMP 09: Conservation Programs for CII Accounts

BMP 09a: CII ULFT Water Savings

BMP 11: Conservation Pricing

BMP 12: Conservation Coordinator

BMP 13: Water Waste Prohibition

BMP 14: Residential ULFT Replacement Programs

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Reported as of 3/3/05

Water Supply & Reuse

Reporting Unit:

So. California Water Company - Arden Cordova District

Year:

2004**Water Supply Source Information**

Supply Source Name	Quantity (AF) Supplied	Supply Type
Groundwater	13598	Groundwater
City of Folsom	4	Imported
American River	6559	Local Watershed

Total AF: 20161

Reported as of 3/3/05

Accounts & Water Use

Reporting Unit Name: Submitted to CUWCC Year:
So. California Water Company - 02/27/2005 2004
Arden Cordova District

A. Service Area Population Information:

1. Total service area population 50008

B. Number of Accounts and Water Deliveries (AF)

Type	Metered		Unmetered	
	No. of Accounts	Water Deliveries (AF)	No. of Accounts	Water Deliveries (AF)
1. Single-Family	2144	1312	10997	10301
2. Multi-Family	191	1861	267	0
3. Commercial	757	3734	0	0
4. Industrial	494	127	0	0
5. Institutional	74	519	0	0
6. Dedicated Irrigation	329	1670	6	33
7. Recycled Water	0	0	0	0
8. Other	0	0	0	0
9. Unaccounted	NA	0	NA	498
Total	3989	9223	11270	10832

Metered**Unmetered**

Reported as of 3/3/05

BMP 01: Water Survey Programs for Single-Family and Multi-Family Residential Customers

Reporting Unit:

**So. California Water Company -
Arden Cordova District**

BMP Form Status:

100% Complete

Year:

2004

A. Implementation

- | | |
|--|------------|
| 1. Based on your signed MOU date, 12/11/1991, your Agency STRATEGY DUE DATE is: | 12/10/1993 |
| 2. Has your agency developed and implemented a targeting/marketing strategy for SINGLE-FAMILY residential water use surveys? | no |
| a. If YES, when was it implemented? | |
| 3. Has your agency developed and implemented a targeting/marketing strategy for MULTI-FAMILY residential water use surveys? | no |
| a. If YES, when was it implemented? | |

B. Water Survey Data

Survey Counts:

	Single Family Accounts	Multi-Family Units
1. Number of surveys offered:	0	0
2. Number of surveys completed:	0	0

Indoor Survey:

3. Check for leaks, including toilets, faucets and meter checks	yes	yes
4. Check showerhead flow rates, aerator flow rates, and offer to replace or recommend replacement, if necessary	yes	yes
5. Check toilet flow rates and offer to install or recommend installation of displacement device or direct customer to ULFT replacement program, as necessary; replace leaking toilet flapper, as necessary	yes	yes

Outdoor Survey:

6. Check irrigation system and timers	yes	yes
7. Review or develop customer irrigation schedule	yes	yes
8. Measure landscaped area (Recommended but not required for surveys)	no	no
9. Measure total irrigable area (Recommended but not required for surveys)	no	no
10. Which measurement method is typically used (Recommended but not required for surveys)		None
11. Were customers provided with information packets that included evaluation results and water savings recommendations?	no	no
12. Have the number of surveys offered and completed, survey results, and survey costs been tracked?	no	no
a. If yes, in what form are surveys tracked?		None

b. Describe how your agency tracks this information.

C. Water Survey Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	0	0
2. Actual Expenditures	0	

D. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

E. Comments

Reported as of 3/3/05

BMP 02: Residential Plumbing Retrofit

Reporting Unit:

**So. California Water Company -
Arden Cordova District**BMP Form Status:
100% CompleteYear:
2004**A. Implementation**

1. Is there an enforceable ordinance in effect in your service area requiring replacement of high-flow showerheads and other water use fixtures with their low-flow counterparts? no
- a. If YES, list local jurisdictions in your service area and code or ordinance in each:
2. Has your agency satisfied the 75% saturation requirement for single-family housing units? no
3. Estimated percent of single-family households with low-flow showerheads: 20%
4. Has your agency satisfied the 75% saturation requirement for multi-family housing units? no
5. Estimated percent of multi-family households with low-flow showerheads: 12%
6. If YES to 2 OR 4 above, please describe how saturation was determined, including the dates and results of any survey research.

B. Low-Flow Device Distribution Information

1. Has your agency developed a targeting/ marketing strategy for distributing low-flow devices? no
- a. If YES, when did your agency begin implementing this strategy?
- b. Describe your targeting/ marketing strategy.

Low-Flow Devices Distributed/ Installed	SF Accounts	MF Units
2. Number of low-flow showerheads distributed:	500	500
3. Number of toilet-displacement devices distributed:	0	0
4. Number of toilet flappers distributed:	0	0
5. Number of faucet aerators distributed:	500	500
6. Does your agency track the distribution and cost of low-flow devices?		no
a. If YES, in what format are low-flow devices tracked?		
b. If yes, describe your tracking and distribution system :		

C. Low-Flow Device Distribution Expenditures

	This Year	Next Year
1. Budgeted Expenditures	5000	5250
2. Actual Expenditures	5000	

D. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No
- a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective

as."

E. Comments

Reported as of 3/3/05

BMP 03: System Water Audits, Leak Detection and Repair

Reporting Unit:

**So. California Water Company -
Arden Cordova District**BMP Form Status:
100% CompleteYear:
2004**A. Implementation**

- | | |
|--|------|
| 1. Has your agency completed a pre-screening system audit for this reporting year? | no |
| 2. If YES, enter the values (AF/Year) used to calculate verifiable use as a percent of total production: | |
| a. Determine metered sales (AF) | 0 |
| b. Determine other system verifiable uses (AF) | 0 |
| c. Determine total supply into the system (AF) | 0 |
| d. Using the numbers above, if (Metered Sales + Other Verifiable Uses) / Total Supply is < 0.9 then a full-scale system audit is required. | 0.00 |
| 3. Does your agency keep necessary data on file to verify the values used to calculate verifiable uses as a percent of total production? | no |
| 4. Did your agency complete a full-scale audit during this report year? | no |
| 5. Does your agency maintain in-house records of audit results or the completed AWWA audit worksheets for the completed audit? | no |
| 6. Does your agency operate a system leak detection program? | no |
| a. If yes, describe the leak detection program: | |

B. Survey Data

- | | |
|--|-----|
| 1. Total number of miles of distribution system line. | 103 |
| 2. Number of miles of distribution system line surveyed. | 5 |

C. System Audit / Leak Detection Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	50000	50000
2. Actual Expenditures	50000	

D. "At Least As Effective As"

- | | |
|--|----|
| 1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? | No |
| a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as." | |

E. Comments

BMP 04: Metering with Commodity Rates for all New Connections and Retrofit of Existing

Reporting Unit: **So. California Water Company - Arden Cordova District** BMP Form Status: **100% Complete** Year: **2004**

A. Implementation

- 1. Does your agency require meters for all new connections and bill by volume-of-use? yes
- 2. Does your agency have a program for retrofitting existing unmetered connections and bill by volume-of-use? yes
 - a. If YES, when was the plan to retrofit and bill by volume-of-use existing unmetered connections completed? 1/1/1992
 - b. Describe the program:

Meter retrofit program described by Water Forum Agreements. Pending CPUC approval.

- 3. Number of previously unmetered accounts fitted with meters during report year. 5

B. Feasibility Study

- 1. Has your agency conducted a feasibility study to assess the merits of a program to provide incentives to switch mixed-use accounts to dedicated landscape meters? no
 - a. If YES, when was the feasibility study conducted? (mm/dd/yy)
 - b. Describe the feasibility study:

- 2. Number of CII accounts with mixed-use meters. 2100
- 3. Number of CII accounts with mixed-use meters retrofitted with dedicated irrigation meters during reporting period. 0

C. Meter Retrofit Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	250000	150000
2. Actual Expenditures	100000	

D. "At Least As Effective As"

- 1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No
 - a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

E. Comments

Reported as of 3/3/05

BMP 05: Large Landscape Conservation Programs and Incentives

Reporting Unit:

**So. California Water
Company - Arden Cordova
District**

**BMP Form Status:
100% Complete**

**Year:
2004**

A. Water Use Budgets

- | | |
|--|-----|
| 1. Number of Dedicated Irrigation Meter Accounts: | 360 |
| 2. Number of Dedicated Irrigation Meter Accounts with Water Budgets: | 0 |
| 3. Budgeted Use for Irrigation Meter Accounts with Water Budgets (AF): | 0 |
| 4. Actual Use for Irrigation Meter Accounts with Water Budgets (AF): | 0 |
| 5. Does your agency provide water use notices to accounts with budgets each billing cycle? | no |

B. Landscape Surveys

- | | |
|--|----|
| 1. Has your agency developed a marketing / targeting strategy for landscape surveys? | no |
| a. If YES, when did your agency begin implementing this strategy? | |
| b. Description of marketing / targeting strategy: | |
| 2. Number of Surveys Offered. | 0 |
| 3. Number of Surveys Completed. | 0 |
| 4. Indicate which of the following Landscape Elements are part of your survey: | |
| a. Irrigation System Check | no |
| b. Distribution Uniformity Analysis | no |
| c. Review / Develop Irrigation Schedules | no |
| d. Measure Landscape Area | no |
| e. Measure Total Irrigable Area | no |
| f. Provide Customer Report / Information | no |
| 5. Do you track survey offers and results? | no |
| 6. Does your agency provide follow-up surveys for previously completed surveys? | no |
| a. If YES, describe below: | |

C. Other BMP 5 Actions

- | | |
|---|-----|
| 1. An agency can provide mixed-use accounts with ETo-based landscape budgets in lieu of a large landscape survey program. Does your agency provide mixed-use accounts with landscape budgets? | no |
| 2. Number of CII mixed-use accounts with landscape budgets. | 0 |
| 3. Do you offer landscape irrigation training? | yes |
| 4. Does your agency offer financial incentives to improve landscape water use efficiency? | no |

Type of Financial Incentive:	Budget Number Awarded	Total
-------------------------------------	------------------------------	--------------

	(Dollars/ Year)	to Customers	Amount Awarded
a. Rebates	0	0	0
b. Loans	0	0	0
c. Grants	0	0	0

5. Do you provide landscape water use efficiency information to new customers and customers changing services? yes

a. If YES, describe below:

Brochures, site visits / surveys as requested

6. Do you have irrigated landscaping at your facilities? yes

a. If yes, is it water-efficient? yes

b. If yes, does it have dedicated irrigation metering? yes

7. Do you provide customer notices at the start of the irrigation season? yes

8. Do you provide customer notices at the end of the irrigation season? yes

D. Landscape Conservation Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	1000	1000
2. Actual Expenditures	1000	

E. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

F. Comments

BMP 06: High-Efficiency Washing Machine Rebate Programs

Reporting Unit:

**So. California Water Company -
Arden Cordova District**

BMP Form Status:
100% Complete

Year:
2004

A. Implementation

1. Do any energy service providers or waste water utilities in your service area offer rebates for high-efficiency washers? no

a. If YES, describe the offerings and incentives as well as who the energy/waste water utility provider is.

2. Does your agency offer rebates for high-efficiency washers? no

3. What is the level of the rebate?

4. Number of rebates awarded.

B. Rebate Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	0	0
2. Actual Expenditures	0	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? no

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

BMP 07: Public Information Programs

Reporting Unit:

**So. California Water Company -
Arden Cordova District**BMP Form Status:
100% CompleteYear:
2004**A. Implementation**

1. Does your agency maintain an active public information program to promote and educate customers about water conservation? yes

a. If YES, describe the program and how it's organized.

Member of Sacramento Sacramento Regional Water Authority. This organization provides free speakers, media announcements, and conservation material to intrested groups

2. Indicate which and how many of the following activities are included in your public information program.

Public Information Program Activity	Yes/No	Number of Events
a. Paid Advertising	yes	100
b. Public Service Announcement	yes	2
c. Bill Inserts / Newsletters / Brochures	yes	7
d. Bill showing water usage in comparison to previous year's usage	yes	
e. Demonstration Gardens	yes	1
f. Special Events, Media Events	yes	3
g. Speaker's Bureau	yes	1
h. Program to coordinate with other government agencies, industry and public interest groups and media	yes	

B. Conservation Information Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	15000	15000
2. Actual Expenditures	15000	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

BMP 08: School Education Programs

Reporting Unit:

**So. California Water Company -
Arden Cordova District**

BMP Form Status:
100% Complete

Year:
2004

A. Implementation

1. Has your agency implemented a school information program to promote water conservation? yes
2. Please provide information on your school programs (by grade level):

Grade	Are grade-appropriate materials distributed?	No. of class presentations	No. of students reached	No. of teachers' workshops
Grades K-3rd	yes	90	1675	2
Grades 4th-6th	yes	90	1675	2
Grades 7th-8th	yes	90	1675	2
High School	yes	90	1675	2

3. Did your Agency's materials meet state education framework requirements? yes
4. When did your Agency begin implementing this program? 1/1/2001

B. School Education Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	2000	2000
2. Actual Expenditures	2000	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No
- a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

Reported as of 3/3/05

BMP 09: Conservation Programs for CII Accounts

Reporting Unit:

**So. California Water
Company - Arden
Cordova District**BMP Form Status:
100% CompleteYear:
2004**A. Implementation**

- | | |
|--|-----|
| 1. Has your agency identified and ranked COMMERCIAL customers according to use? | yes |
| 2. Has your agency identified and ranked INDUSTRIAL customers according to use? | yes |
| 3. Has your agency identified and ranked INSTITUTIONAL customers according to use? | yes |

Option A: CII Water Use Survey and Customer Incentives Program

- | | |
|---|-----|
| 4. Is your agency operating a CII water use survey and customer incentives program for the purpose of complying with BMP 9 under this option? | yes |
|---|-----|

CII Surveys	Commercial Accounts	Industrial Accounts	Institutional Accounts
a. Number of New Surveys Offered	0	0	0
b. Number of New Surveys Completed	0	0	0
c. Number of Site Follow-ups of Previous Surveys (within 1 yr)	0	0	0
d. Number of Phone Follow-ups of Previous Surveys (within 1 yr)	0	0	0
CII Survey Components	Commercial Accounts	Industrial Accounts	Institutional Accounts
e. Site Visit	no	no	no
f. Evaluation of all water-using apparatus and processes	no	no	no
g. Customer report identifying recommended efficiency measures, paybacks and agency incentives	no	no	no
Agency CII Customer Incentives	Budget (\$/Year)	No. Awarded to Customers	Total \$ Amount Awarded
h. Rebates	0	0	0
i. Loans	0	0	0
j. Grants	0	0	0
k. Others	0	0	0

Option B: CII Conservation Program Targets

- | | |
|---|----|
| 5. Does your agency track CII program interventions and water | no |
|---|----|

savings for the purpose of complying with BMP 9 under this option?

- | | |
|---|----|
| 6. Does your agency document and maintain records on how savings were realized and the method of calculation for estimated savings? | no |
| 7. Estimated annual savings (AF/yr) from site-verified actions taken by agency since 1991. | 0 |
| 8. Estimated annual savings (AF/yr) from non-site-verified actions taken by agency since 1991. | 0 |

B. Conservation Program Expenditures for CII Accounts

	This Year	Next Year
1. Budgeted Expenditures	0	0
2. Actual Expenditures	0	

C. "At Least As Effective As"

- | | |
|---|----|
| 1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? | No |
| <p>a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."</p> | |

D. Comments

BMP 09a: CII ULFT Water Savings

Reporting Unit:

**So. California Water Company
- Arden Cordova District**

BMP Form Status:
100% Complete

Year:
2004

1. Did your agency implement a CII ULFT replacement program in the reporting year? Yes
If No, please explain why on Line B. 10.

A. Targeting and Marketing

1. What basis does your agency use to target customers for participation in this program? Check all that apply. Potential savings

a. Describe which method you found to be the most effective overall, and which was the most effective per dollar expended.

Bill messages, Inserts and regional advertising with Sacramento Regional Sanitaton District.

2. How does your agency advertise this program? Check all that apply.

Bill insert
Bill message
Radio PSAs
Trade publications
Other print media

a. Describe which method you found to be the most effective overall, and which was the most effective per dollar expended.

Bill messages, Inserts and regional advertising with Sacramento Regional Sanitaton District.

B. Implementation

1. Does your agency keep and maintain customer participant information? (Read the Help information for a complete list of all the information for this BMP.) Yes
2. Would your agency be willing to share this information if the CUWCC did a study to evaluate the program on behalf of your agency? No
3. What is the total number of customer accounts participating in the program during the last year ? 10000

4. CII Subsector	Number of Toilets Replaced			
	Standard Gravity Tank	Air Assisted	Valve Floor Mount	Valve Wall Mount
a. Offices	0	0	0	0
b. Retail / Wholesale	0	0	0	0
c. Hotels	0	0	0	0
d. Health	0	0	0	0
e. Industrial	0	0	0	0
f. Schools: K to 12	0	0	0	0
g. Eating	0	0	0	0
h. Govern-ment	0	0	0	0
i. Churches	0	0	0	0

j. Other 0 0 0 0

5. Program design. Rebate or voucher

6. Does your agency use outside services to implement this program? No

a. If yes, check all that apply. Consultant

7. Participant tracking and follow-up. Telephone Site Visit

8. Based on your program experience, please rank on a scale of 1 to 5, with 1 being the least frequent cause and 5 being the most frequent cause, the following reasons why customers refused to participate in the program.

- a. Disruption to business 1
- b. Inadequate payback 5
- c. Inadequate ULFT performance 1
- d. Lack of funding 3
- e. American's with Disabilities Act 1
- f. Permitting 3
- g. Other. Please describe in B. 9.

9. Please describe general program acceptance/resistance by customers, obstacles to implementation, and other issues affecting program implementation or effectiveness.

Difficult to sell ULFT advantages to CII from an economic or cost benefit perspective, water rates are very reasonable and do not tend to be of concern to CII customers as yet.

10. Please provide a general assessment of the program for this reporting year. Did your program achieve its objectives? Were your targeting and marketing approaches effective? Were program costs in line with expectations and budgeting?

A regional marketing approach seems to be effective and economical for all Sacramento Regional Water Authority participants.

C. Conservation Program Expenditures for CII ULFT

1. CII ULFT Program: Annual Budget & Expenditure Data

	Budgeted	Actual Expenditure
a. Labor	2500	125
b. Materials	500	100
c. Marketing & Advertising	2500	125
d. Administration & Overhead	2000	150
e. Outside Services	2500	250
f. Total	10000	750

2. CII ULFT Program: Annual Cost Sharing

a. Wholesale agency contribution	0
b. State agency contribution	0
c. Federal agency	0

contribution	
d. Other contribution	0
e. Total	0

D. Comments

Reported as of 3/3/05

BMP 11: Conservation Pricing

Reporting Unit:

**So. California Water Company -
Arden Cordova District**

BMP Form

Status:

100% Complete

Year:

2004**A. Implementation****Rate Structure Data Volumetric Rates for Water Service by Customer Class****1. Residential**

a. Water Rate Structure	Uniform
b. Sewer Rate Structure	Service Not Provided
c. Total Revenue from Volumetric Rates	\$0
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	\$0

2. Commercial

a. Water Rate Structure	Uniform
b. Sewer Rate Structure	Service Not Provided
c. Total Revenue from Volumetric Rates	\$0
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	\$0

3. Industrial

a. Water Rate Structure	Uniform
b. Sewer Rate Structure	Service Not Provided
c. Total Revenue from Volumetric Rates	\$0
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	\$0

4. Institutional / Government

a. Water Rate Structure	Uniform
b. Sewer Rate Structure	Service Not Provided
c. Total Revenue from Volumetric Rates	\$0
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	\$0

5. Irrigation

a. Water Rate Structure	Uniform
b. Sewer Rate Structure	Service Not Provided
c. Total Revenue from Volumetric Rates	\$0
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	\$0

6. Other

a. Water Rate Structure	Uniform
b. Sewer Rate Structure	Service Not Provided
c. Total Revenue from Volumetric Rates	\$0
d. Total Revenue from Non-Volumetric	

Charges, Fees and other Revenue Sources \$0

B. Conservation Pricing Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	0	0
2. Actual Expenditures	0	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

BMP 12: Conservation Coordinator

Reporting Unit:

**So. California Water Company -
Arden Cordova District**BMP Form Status:
100% CompleteYear:
2004**A. Implementation**

- | | |
|---|---|
| 1. Does your Agency have a conservation coordinator? | yes |
| 2. Is this a full-time position? | no |
| 3. If no, is the coordinator supplied by another agency with which you cooperate in a regional conservation program ? | no |
| 4. Partner agency's name: | |
| 5. If your agency supplies the conservation coordinator: | |
| a. What percent is this conservation coordinator's position? | 5% |
| b. Coordinator's Name | Donna Knox |
| c. Coordinator's Title | Administrative Analyst |
| d. Coordinator's Experience and Number of Years | 6 years of customer service and field operations, 2 |
| e. Date Coordinator's position was created (mm/dd/yyyy) | 1/1/2002 |
| 6. Number of conservation staff, including Conservation Coordinator. | 1 |

B. Conservation Staff Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	2000	2000
2. Actual Expenditures	2000	

C. "At Least As Effective As"

- | | |
|--|----|
| 1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? | no |
| a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as." | |

D. Comments

Reported as of 3/3/05

BMP 13: Water Waste Prohibition

Reporting Unit:

**So. California Water Company -
Arden Cordova District**BMP Form Status:
100% CompleteYear:
2004**A. Requirements for Documenting BMP Implementation**

1. Is a water waste prohibition ordinance in effect in your service area? yes
- a. If YES, describe the ordinance:
- PUC-Tariff Rule 14.1
2. Is a copy of the most current ordinance(s) on file with CUWCC? yes
- a. List local jurisdictions in your service area in the first text box and water waste ordinance citations in each jurisdiction in the second text box:
- NA NA

B. Implementation

1. Indicate which of the water uses listed below are prohibited by your agency or service area.
- a. Gutter flooding yes
- b. Single-pass cooling systems for new connections no
- c. Non-recirculating systems in all new conveyor or car wash systems yes
- d. Non-recirculating systems in all new commercial laundry systems yes
- e. Non-recirculating systems in all new decorative fountains yes
- f. Other, please name yes
no hosing of hard surfaces
2. Describe measures that prohibit water uses listed above:

Customer informational billing inserts. System policing.

Water Softeners:

3. Indicate which of the following measures your agency has supported in developing state law:
- a. Allow the sale of more efficient, demand-initiated regenerating DIR models. yes
- b. Develop minimum appliance efficiency standards that:
- i.) Increase the regeneration efficiency standard to at least 3,350 grains of hardness removed per pound of common salt used. no
- ii.) Implement an identified maximum number of gallons discharged per gallon of soft water produced. no
- c. Allow local agencies, including municipalities and special districts, to set more stringent standards and/or to ban on-site regeneration of water softeners if it is demonstrated and found by the agency governing board that there is an adverse effect on the reclaimed water or groundwater supply. no
4. Does your agency include water softener checks in home water audit programs? no
5. Does your agency include information about DIR and exchange-type water softeners in educational efforts to encourage replacement of less efficient timer models? no

C. Water Waste Prohibition Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	1000	2000
2. Actual Expenditures	500	

D. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? no

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

E. Comments

BMP 14: Residential ULFT Replacement Programs

Reporting Unit: **So. California Water Company - Arden Cordova District** BMP Form Status: **100% Complete** Year: **2004**

A. Implementation

	Single-Family Accounts	Multi-Family Units
1. Does your Agency have program(s) for replacing high-water-using toilets with ultra-low flush toilets?	yes	yes

Number of Toilets Replaced by Agency Program During Report Year

Replacement Method	SF Accounts	MF Units
2. Rebate	50	50
3. Direct Install	0	0
4. CBO Distribution	0	0
5. Other	0	0
Total	50	50

6. Describe your agency's ULFT program for single-family residences.

Partnered with Regional Water Authority - Regional Water Efficiency Programs and Sacramento Regional Waste Water Authority.

7. Describe your agency's ULFT program for multi-family residences.

SAME

8. Is a toilet retrofit on resale ordinance in effect for your service area? no

9. List local jurisdictions in your service area in the left box and ordinance citations in each jurisdiction in the right box:

NA NA

B. Residential ULFT Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	10500	10500
2. Actual Expenditures	750	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? no

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

Reported as of 7/1

BMP 01 Coverage: Water Survey Programs for Single-Family and Multi-Family Residential Customers

Reporting Unit:
So. California Water Company - Arden Cordova District

Reporting Period:
03-04

MOU Exhibit 1 Coverage Requirement

No exemption request filed

Agency indicated "at least as effective as" implementation during report period? No

A Reporting Unit (RU) must meet three conditions to satisfy strict compliance for BMP 1.

Condition 1: Adopt survey targeting and marketing strategy on time

Condition 2: Offer surveys to 20% of SF accounts and 20% of MF units during report period

Condition 3: Be on track to survey 15% of SF accounts and 15% of MF units within 10 years of implementation start date.

Test for Condition 1

So. California Water Company - Arden Cordova District
 to Implement Targeting/Marketing Program by: 1999

Year So. California Water Company - Arden Cordova District Reported Implementing Targeting/Marketing Program:

	<u>Single-Family</u>	<u>Multi-Family</u>
So. California Water Company - Arden Cordova District Met Targeting/Marketing Coverage Requirement:	NO	NO

Test for Condition 2

			<u>Single-Family</u>	<u>Multi-Family</u>
Survey Program to Start by:	1998	Residential Survey Offers (%)		
Reporting Period:	03-04	Survey Offers ≥ 20%	NO	NO

Test for Condition 3

	Completed Residential Surveys	
	<u>Single Family</u>	<u>Multi-Family</u>
Total Completed Surveys 1999 - 2004:		
Past Credit for Surveys Completed Prior to 1999 (Implementation of Reporting Database):		

Total + Credit		
Residential Accounts in Base Year	11,542	6,465
So. California Water Company - Arden Cordova District Survey Coverage as % of Base Year Residential Accounts		
Coverage Requirement by Year 7 of Implementation per Exhibit 1	7.90%	7.90%
So. California Water Company - Arden Cordova District on Schedule to Meet 10-Year Coverage Requirement	NO	NO

BMP 1 COVERAGE STATUS SUMMARY:**Water supplier has not met one or more coverage requirements for this BMP.**

Reported as of 7/1

BMP 02 Coverage: Residential Plumbing Retrofit

Reporting Unit:

So. California Water Company - Arden Cordova District

Reporting Period:
03-04

MOU Exhibit 1 Coverage Requirement

No exemption request filed

Agency indicated "at least as effective as" implementation during report period?

No

An agency must meet one of three conditions to satisfy strict compliance for BMP 2.

Condition 1: The agency has demonstrated that 75% of SF accounts and 75% of MF units constructed prior to 1992 are fitted with low-flow showerheads.

Condition 2: An enforceable ordinance requiring the replacement of high-flow showerheads and other water use fixtures with their low-flow counterparts is in place for the agency's service area.

Condition 3: The agency has distributed or directly installed low-flow showerheads and other low-flow plumbing devices to not less than 10% of single-family accounts and 10% of multi-family units constructed prior to 1992 during the reporting period.

Test for Condition 1

Report Year	Report Period	Single-Family		Multi-Family	
		Reported Saturation	Saturation > 75%?	Reported Saturation	Saturation > 75%?
1999	99-00		NO		NO
2000	99-00	4.00%	NO		NO
2001	01-02		NO		NO
2002	01-02		NO		NO
2003	03-04	20.00%	NO	10.00%	NO
2004	03-04	20.00%	NO	12.00%	NO

Test for Condition 2

Report Year	Report Period	So. California Water Company - Arden Cordova District has ordinance requiring showerhead retrofit?
1999	99-00	NO
2000	99-00	NO
2001	01-02	NO
2002	01-02	NO
2003	03-04	NO
2004	03-04	NO

Test for Condition 3

Reporting Period: 03-04

1992 SF Accounts	Num. Showerheads Distributed to SF Accounts	Single-Family Coverage Ratio	SF Coverage Ratio > 10%
10,479	575	5.5%	NO
1992 MF	Num. Showerheads Distributed to	Multi-Family	MF Coverage

<u>Accounts</u>	<u>MF Accounts</u>	<u>Coverage Ratio</u>	<u>Ratio > 10%</u>
5,980	500	8.4%	NO

BMP 2 COVERAGE STATUS SUMMARY:

Water supplier has not met one or more coverage requirements for this BMP.

Reported as of 7/1

BMP 03 Coverage: System Water Audits, Leak Detection and Repair

Reporting Unit:
So. California Water Company - Arden Cordova District

Reporting Period:
03-04

MOU Exhibit 1 Coverage Requirement

No exemption request filed

Agency indicated "at least as effective as" implementation during report period? No

An agency must meet one of two conditions to be in compliance with BMP 3:

Condition 1: Perform a prescreening audit. If the result is equal to or greater than 0.9 nothing more needs be done.

Condition 2: Perform a prescreening audit. If the result is less than 0.9, perform a full audit in accordance with AWWA's Manual of Water Supply Practices, Water Audits, and Leak Detection.

Test for Conditions 1 and 2

<u>Report Year</u>	<u>Report Period</u>	<u>Pre-Screen Completed</u>	<u>Pre-Screen Result</u>	<u>Full Audit Indicated</u>	<u>Full Audit Completed</u>
1999	99-00	NO			NO
2000	99-00	NO			NO
2001	01-02	NO			NO
2002	01-02	NO			NO
2003	03-04	NO			NO
2004	03-04	NO			NO

BMP 3 COVERAGE STATUS SUMMARY:

Water supplier has not met one or more coverage requirements for this BMP.

Reported as of 7/1

BMP 04 Coverage: Metering with Commodity Rates for all New Connections and Retrofit of Existing

Reporting Unit:

**So. California Water
Company - Arden Cordova
District**

Reporting Period:

03-04

MOU Exhibit 1 Coverage Requirement

No exemption request filed

Agency indicated "at least as effective
as" implementation during report
period?

No

An agency must be on track to retrofit 100% of its unmetered accounts within 10 years to be in compliance with BMP 4.

Test for Compliance

Total Meter Retrofits Reported through 2004	55
No. of Unmetered Accounts in Base Year	13,100
Meter Retrofit Coverage as % of Base Year Unmetered Accounts	0.4%
Coverage Requirement by Year 6 of Implementation per Exhibit 1	42.0%
RU on Schedule to meet 10 Year Coverage Requirement	NO

BMP 4 COVERAGE STATUS SUMMARY:

Water supplier has not met one or more coverage requirements for this BMP.

Reported as of 7/1

BMP 05 Coverage: Large Landscape Conservation Programs and Incentives

Reporting Unit:

So. California Water Company - Arden Cordova District

Reporting Period:

03-04

MOU Exhibit 1 Coverage Requirement

No exemption request filed

Agency indicated "at least as effective as" implementation during report period?

No

An agency must meet three conditions to comply with BMP 5.

Condition 1: Develop water budgets for 90% of its dedicated landscape meter accounts within four years of the date implementation is to start.

Condition 2: (a) Offer landscape surveys to at least 20% of its CII accounts with mixed use meters each report cycle and be on track to survey at least 15% of its CII accounts with mixed use meters within 10 years of the date implementation is to start OR (b) Implement a dedicated landscape meter retrofit program for CII accounts with mixed use meters or assign landscape budgets to mixed use meters.

Condition 3: Implement and maintain customer incentive program(s) for irrigation equipment retrofits.

Test for Condition 1

Year	Report Period	BMP 5 Implementation Year	No. of Irrigation Meter Accounts	No. of Irrigation Accounts with Budgets	Budget Coverage Ratio	90% Coverage Met by Year 4
1999	99-00	1	1,200			NA
2000	99-00	2	345			NA
2001	01-02	3	345			NA
2002	01-02	4	350			No
2003	03-04	5	355			No
2004	03-04	6	360			No

Test for Condition 2a (survey offers)

Select Reporting Period:	03-04
Large Landscape Survey Offers as % of Mixed Use Meter CII Accounts	
Survey Offers Equal or Exceed 20% Coverage Requirement	NO

Test for Condition 2a (surveys completed)

Total Completed Landscape Surveys Reported through Credit for Surveys Completed Prior to Implementation of Reporting Database	
Total + Credit	
CII Accounts in Base Year	807
RU Survey Coverage as a % of Base Year CII Accounts	
Coverage Requirement by Year of Implementation per Exhibit 1	6.3%

RU on Schedule to Meet 10 Year Coverage Requirement

NO

Test for Condition 2b (mixed use budget or meter retrofit program)

<u>Report Year</u>	<u>Report Period</u>	<u>BMP 5 Implementation Year</u>	<u>Agency has mix-use budget program</u>	<u>No. of mixed-use budgets</u>
1999	99-00	1	NO	
2000	99-00	2	NO	
2001	01-02	3	NO	
2002	01-02	4	NO	
2003	03-04	5	NO	
2004	03-04	6	NO	

<u>Report Year</u>	<u>Report Period</u>	<u>BMP 4 Implementation Year</u>	<u>No. of mixed use CII accounts</u>	<u>No. of mixed use CII accounts fitted with irrig. meters</u>
1999	99-00	1	829	
2000	99-00	2	2,069	
2001	01-02	3	2,075	
2002	01-02	4	2,080	
2003	03-04	5	2,080	
2004	03-04	6	2,100	

Test for Condition 3

<u>Report Year</u>	<u>Report Period</u>	<u>BMP 5 Implementation Year</u>	<u>RU offers financial incentives?</u>	<u>No. of Loans</u>	<u>Total Amt. Loans</u>
1999	99-00	1	NO		
2000	99-00	2	NO		
2001	01-02	3	NO		
2002	01-02	4	NO		
2003	03-04	5	NO		
2004	03-04	6	NO		

<u>Report Year</u>	<u>Report Period</u>	<u>No. of Grants</u>	<u>Total Amt. Grants</u>	<u>No. of rebates</u>	<u>Total Amt. Rebates</u>
1999	99-00				
2000	99-00				
2001	01-02				
2002	01-02				
2003	03-04				
2004	03-04				

BMP 5 COVERAGE STATUS SUMMARY:

Water supplier has not met one or more coverage requirements for this BMP.

Reported as of 7/1

BMP 06 Coverage: High-Efficiency Washing Machine Rebate Programs

Reporting Unit:
So. California Water Company - Arden Cordova District

Reporting Period:
03-04

MOU Exhibit 1 Coverage Requirement

No exemption request filed

Agency indicated "at least as effective as" implementation during report period? No

An agency must meet one condition to comply with BMP 6.

Condition 1: Offer a cost-effective financial incentive for high-efficiency washers if one or more energy service providers in service area offer financial incentives for high-efficiency washers.

Test for Condition 1

Year	Report Period	BMP 6 Implementation Year	Rebate Offered by ESP?	Rebate Offered by RU?	Rebate Amount
1999	99-00	1	YES	NO	
2000	99-00	2	YES	YES	150.00
2001	01-02	3	YES	NO	
2002	01-02	4	YES	NO	
2003	03-04	5	YES	NO	
2004	03-04	6	NO	NO	

Year	Report Period	BMP 6 Implementation Year	No. Rebates Awarded	Coverage Met?
1999	99-00	1		NO
2000	99-00	2		YES
2001	01-02	3		NO
2002	01-02	4		NO
2003	03-04	5		NO
2004	03-04	6		YES

BMP 6 COVERAGE STATUS SUMMARY:

Water supplier has not met one or more coverage requirements for this BMP.

Reported as of 7/1

BMP 07 Coverage: Public Information Programs

Reporting Unit:

So. California Water Company - Arden Cordova

Reporting Period:

03-04**District****MOU Exhibit 1 Coverage Requirement**

No exemption request filed

Agency indicated "at least as effective as" implementation during report period?

No

An agency must meet one condition to comply with BMP 7.

Condition 1: Implement and maintain a public information program consistent with BMP 7's definition.

Test for Condition 1

<u>Year</u>	<u>Report Period</u>	<u>BMP 7 Implementation Year</u>	<u>RU Has Public Information Program?</u>
1999	99-00	2	YES
2000	99-00	3	YES
2001	01-02	4	YES
2002	01-02	5	YES
2003	03-04	6	YES
2004	03-04	7	YES

BMP 7 COVERAGE STATUS SUMMARY:**Water supplier is meeting coverage requirements for this BMP.**

Reported as of 7/1

BMP 08 Coverage: School Education Programs

Reporting Unit:

So. California Water Company - Arden Cordova District

Reporting Period:
03-04

MOU Exhibit 1 Coverage Requirement

No exemption request filed

Agency indicated "at least as effective as" implementation during report period?

No

An agency must meet one condition to comply with BMP 8.

Condition 1: Implement and maintain a school education program consistent with BMP 8's definition.

Test for Condition 1

<u>Year</u>	<u>Report Period</u>	<u>BMP 8 Implementation Year</u>	<u>RU Has School Education Program?</u>
1999	99-00	2	YES
2000	99-00	3	YES
2001	01-02	4	YES
2002	01-02	5	YES
2003	03-04	6	YES
2004	03-04	7	YES

BMP 8 COVERAGE STATUS SUMMARY:

Water supplier is meeting coverage requirements for this BMP.

Reported as of 7/1

BMP 09 Coverage: Conservation Programs for CII Accounts

Reporting Unit:
So. California Water Company - Arden Cordova District

Reporting Period:
03-04

MOU Exhibit 1 Coverage Requirement

No exemption request filed

Agency indicated "at least as effective as" implementation during report period? No

An agency must meet three conditions to comply with BMP 9.

Condition 1: Agency has identified and ranked by use commercial, industrial, and institutional accounts.

Condition 2(a): Agency is on track to survey 10% of commercial accounts, 10% of industrial accounts, and 10% of institutional accounts within 10 years of date implementation to commence.

OR

Condition 2(b): Agency is on track to reduce CII water use by an amount equal to 10% of baseline use within 10 years of date implementation to commence.

OR

Condition 2(c): Agency is on track to meet the combined target as described in Exhibit 1 BMP 9 documentation.

Test for Condition 1

Year	Report Period	BMP 9 Implementation Year	Ranked Com. Use	Ranked Ind. Use	Ranked Inst. Use
1999	99-00	1	YES	YES	YES
2000	99-00	2	YES	YES	YES
2001	01-02	3	YES	YES	YES
2002	01-02	4	YES	YES	YES
2003	03-04	5	YES	YES	YES
2004	03-04	6	YES	YES	YES

Test for Condition 2a

	Commercial	Industrial	Institutional
Total Completed Surveys Reported through 2004			
Credit for Surveys Completed Prior to Implementation of Reporting Databases			
Total + Credit			
CII Accounts in Base Year	654	35	118
RU Survey Coverage as % of Base Year CII Accounts			
Coverage Requirement by Year 6 of Implementation per Exhibit 1	4.2%	4.2%	4.2%
RU on Schedule to Meet 10 Year Coverage Requirement	NO	NO	NO

Test for Condition 2a

<u>Year</u>	<u>Report Period</u>	<u>BMP 9 Implementation Year</u>	<u>Performance Target Savings (AF/yr)</u>	<u>Performance Target Savings Coverage</u>	<u>Performance Target Savings Coverage Requirement</u>	<u>Coverage Requirement Met</u>
1999	99-00	1			0.5%	NO
2000	99-00	2			1.0%	NO
2001	01-02	3			1.7%	NO
2002	01-02	4			2.4%	NO
2003	03-04	5			3.3%	NO
2004	03-04	6			4.2%	NO

Test for Condition 2c

Total BMP 9 Surveys + Credit	
BMP 9 Survey Coverage	
BMP 9 Performance Target Coverage	
BMP 9 Survey + Performance Target Coverage	
Combined Coverage Equals or Exceeds Coverage Requirement?	NO

BMP 9 COVERAGE STATUS SUMMARY:

Water supplier has not met one or more coverage requirements for this BMP.

Reported as of 7/1

BMP 11 Coverage: Conservation Pricing

Reporting Unit:

So. California Water Company - Arden Cordova District

Reporting Period:

03-04

MOU Exhibit 1 Coverage Requirement

No exemption request filed

Agency indicated "at least as effective as" implementation during report period?

No

An agency must meet one condition to comply with BMP 11.

Agency shall maintain rate structure consistent with BMP 11's definition of conservation pricing. Implementation methods shall be at least as effective as eliminating non-conserving pricing and adopting conserving pricing. For signatories supplying both water and sewer service, this BMP applies to pricing of both water and sewer service. Signatories that supply water but not sewer service shall make good faith efforts to work with sewer agencies so that those sewer agencies adopt conservation pricing for sewer service.

a) Non-conserving pricing provides no incentives to customers to reduce use. Such pricing is characterized by one or more of the following components: rates in which the unit price decreases as the quantity used increases (declining block rates); rates that involve charging customers a fixed amount per billing cycle regardless of the quantity used; pricing in which the typical bill is determined by high fixed charges and low commodity charges.

b) Conservation pricing provides incentives to customers to reduce average or peak use, or both. Such pricing includes: rates designed to recover the cost of providing service; and billing for water and sewer service based on metered water use. Conservation pricing is also characterized by one or more of the following components: rates in which the unit rate is constant regardless of the quantity used (uniform rates) or increases as the quantity used increases (increasing block rates); seasonal rates or excess-use surcharges to reduce peak demands during summer months; rates based upon the longrun marginal cost or the cost of adding the next unit of capacity to the system.

Test for Condition 1

<u>Year</u>	<u>Report Period</u>	<u>RU Employed Non Conserving Rate Structure</u>	<u>RU Meets BMP 11 Coverage Requirement</u>
1999	99-00	YES	NO
2000	99-00	YES	NO
2001	01-02	YES	NO
2002	01-02	YES	NO
2003	03-04	NO	YES
2004	03-04	NO	YES

BMP 11 COVERAGE STATUS SUMMARY:

Water supplier is meeting coverage requirements for this BMP.

Reported as of 7/1

BMP 12 Coverage: Conservation Coordinator

Reporting Unit:

So. California Water Company - Arden Cordova District

Reporting Period:

03-04

MOU Exhibit 1 Coverage Requirement

No exemption request filed

Agency indicated "at least as effective as" implementation during report period?

No

Agency shall staff and maintain the position of conservation coordinator and provide support staff as necessary.

Test for Compliance

<u>Report Year</u>	<u>Report Period</u>	<u>Conservation Coordinator Position Staffed?</u>	<u>Total Staff on Team (incl. CC)</u>
1999	* 99-00	YES	1
2000	99-00	YES	1
2001	01-02	YES	1
2002	01-02	YES	
2003	03-04	YES	
2004	03-04	YES	1

BMP 12 COVERAGE STATUS SUMMARY:

Water supplier is meeting coverage requirements for this BMP.

Reported as of 7/1

BMP 13 Coverage: Water Waste Prohibition

Reporting Unit:
So. California Water Company - Arden
Cordova District

Reporting Period:
03-04

MOU Exhibit 1 Coverage Requirement

No exemption request filed

Agency indicated "at least as effective as" implementation during report period? No

An agency must meet one condition to comply with BMP 13.

Implementation methods shall be enacting and enforcing measures prohibiting gutter flooding, single pass cooling systems in new connections, non-recirculating systems in all new conveyer car wash and commercial laundry systems, and non-recycling decorative water fountains.

Test for Condition 1

Agency or service area prohibits:

Year	<u>Gutter Flooding</u>	<u>Single-Pass Cooling Systems</u>	<u>Single-Pass Car Wash</u>	<u>Single-Pass Laundry</u>	<u>Single-Pass Fountains</u>	<u>Other</u>	<u>RU has ordinance that meets coverage requirement</u>
1999	yes	no	yes	yes	yes	yes	NO
2000	yes	no	yes	yes	yes	yes	NO
2001	yes	no	yes	yes	yes	yes	NO
2002	yes	no	yes	yes	yes	yes	NO
2003	yes	no	yes	yes	yes	yes	NO
2004	yes	no	yes	yes	yes	yes	NO

BMP 13 COVERAGE STATUS SUMMARY:

Water supplier has not met one or more coverage requirements for this BMP.

BMP 14 Coverage: Residential ULFT Replacement Programs

Reporting Unit: **So. California Water Company - Arden Cordova District**

MOU Exhibit 1 Coverage Requirement

A Reporting Unit (RU) must meet one of the following conditions to be in compliance with BMP 14.

Condition 1: Retrofit-on-resale (ROR) ordinance in effect in service area.

Condition 2: Water savings from toilet replacement programs equal to 90% of Exhibit 6 coverage requirement.

An agency with an exemption for BMP 14 is not required to meet one of the above conditions. This report treats an agency with missing base year data required to compute the Exhibit 6 coverage requirement as out of compliance with BMP 14.

Status: Water supplier has not met one or more coverage requirements for this BMP. as of 2004

<u>Coverage Year</u>	<u>BMP 14 Data Submitted to CUWCC</u>	<u>Exemption Filed with CUWCC</u>	<u>ROR Ordinance in Effect</u>	<u>Exhibit 6 Coverage Req'mt (AF)</u>	<u>Toilet Replacement Program Water Savings* (AF)</u>
1998	Yes			44.47	78.50
1999	Yes	No	No	126.46	108.64
2000	Yes	No	No	239.95	137.78
2001	Yes	No	No	379.68	165.76
2002	Yes	No	No	541.12	196.35
2003	Yes	No	No	720.30	227.00
2004	Yes	No	No	913.80	260.15
2005	No	No	No	1118.67	
2006	No	No	No	1332.32	
2007	No	No	No	1552.55	

*NOTE: Program water savings listed are net of the plumbing code. Savings are cumulative (not annual) between 1991 and the given year. Residential ULFT count data from unsubmitted forms are NOT included in the calculation.

BMP 14 COVERAGE STATUS SUMMARY:

Water supplier has not met one or more coverage requirements for this BMP.

BMP 14 Coverage: Residential ULFT Replacement Programs

Reporting Unit: So. California Water Company - Arden Cordova District

BMP 14 Coverage Calculation Detail: Retrofit on Resale (ROR) Ordinance Water Savings

	Single Family	Multi-Family
1992 Housing Stock		
Average rate of natural replacement (% of remaining stock)	.04	.04
Average rate of housing demolition (% of remaining stock)	.005	.005
Estimated Housing Units with 3.5+ gpf Toilets in 1997	8553.19	4881.01
Average resale rate	.049	.104
Average persons per unit		
Average toilets per unit		
Average savings per home (gpd; from Exhibit 6)	43.1	46.3

Single Family Housing Units

Coverage Year	Unretrofitted Houses	Houses Sold	Houses Unsold	Sold and Retrofitted	Sold and Already Retrofitted	Unsold and Retrofitted	Gross ROR Savings (AFY)	Nat'l Replacement Only Savings (AFY)	Net ROR Savings (AFY)
1998	7812.45	417.01	8093.42	417.01		323.74	128.72	109.39	19.32
1999	7135.85	414.93	8052.95	380.90	34.03	295.70	161.38	125.17	36.21
2000	6517.85	412.85	8012.69	347.91	64.94	270.09	191.21	140.32	50.89
2001	5953.38	410.79	7972.62	317.78	93.01	246.70	218.46	154.87	63.59
2002	5437.78	408.73	7932.76	290.26	118.48	225.33	243.34	168.84	74.51
2003	4966.85	406.69	7893.10	265.12	141.57	205.82	266.08	182.25	83.83
2004	4536.69	404.66	7853.63	242.16	162.50	187.99	286.84	195.13	91.71
2005	4143.79	402.63	7814.36	221.19	181.45	171.71	305.81	207.49	98.31
2006	3784.92	400.62	7775.29	202.03	198.59	156.84	323.13	219.37	103.76
2007	3457.13	398.62	7736.41	184.53	214.08	143.26	338.95	230.77	108.18

Multi Family Housing Units

Coverage Year	Unretrofitted Houses	Houses Sold	Houses Unsold	Sold and Retrofitted	Sold and Already Retrofitted	Unsold and Retrofitted	Gross ROR Savings (AFY)	Nat'l Replacement Only Savings (AFY)	Net ROR Savings (AFY)
1998	4201.86	505.09	4351.52	505.09		174.06	92.21	67.06	25.14
1999	3617.21	502.56	4329.76	434.81	67.75	149.84	122.52	76.73	45.79
2000	3113.91	500.05	4308.11	374.31	125.74	128.99	148.62	86.02	62.60
2001	2680.64	497.55	4286.57	322.23	175.32	111.04	171.09	94.94	76.15
2002	2307.65	495.06	4265.14	277.39	217.67	95.59	190.43	103.50	86.93
2003	1986.56	492.59	4243.81	238.80	253.79	82.29	207.08	111.73	95.35
2004	1710.15	490.12	4222.59	205.57	284.55	70.84	221.41	119.62	101.79
2005	1472.20	487.67	4201.48	176.97	310.71	60.99	233.75	127.20	106.55
2006	1267.36	485.23	4180.47	152.34	332.89	52.50	244.37	134.48	109.89

2007	1091.02	482.81	4159.57	131.15	351.66	45.19	253.52	141.47	112.05
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Appendix F
**Rule No. 14.1: Mandatory Water Conservation,
Restrictions, and Rationing Program**

Rule No. 14.1

MANDATORY WATER CONSERVATION, RESTRICTIONS AND RATIONING PROGRAM (N)

Page 1

A. GENERAL INFORMATION:

If water supplies are projected to be insufficient to meet normal customer demand, and are beyond the control of the Company, the Company may elect to implement voluntary conservation using the portion of this plan set forth in Section C of this rule after notifying the Commission's Water Division of its intent. If, in the opinion of the Company, more stringent water measures are required, the Company shall request Commission authorization to implement the mandatory conservation and rationing measures set forth in Section D.

The Commission shall authorize mandatory conservation and rationing by approving Schedule No. 14.1, Mandatory Water Conservation and Rationing. When Schedule No. 14.1 has expired or is not in effect, mandatory conservation and rationing measures will not be in force. Schedule No. 14.1 will set forth water use violation fines, charges for removal of flow restrictors, and the period during which mandatory conservation and rationing measures will be in effect.

When the applicable Schedule No. 14.1 is in effect and the Company determines that water supplies are again sufficient to meet normal demands, and mandatory conservation and rationing measures are no longer necessary, the Company shall seek Commission approval to rescind Schedule No. 14.1 to discontinue rationing.

In the event of a water supply shortage requiring a voluntary or mandatory program, the Company shall make available to its customers water conservation kits as required by Rule No. 20. The Company shall notify all customers of the availability of conservation kits.

B. DEFINITIONS

As used in this water rationing plan, the word:

1. "Company" means the Southern California Water Company, California Cities Water, and Arden-Cordova Water Service;
2. "Persons" means an individual customer, resident, business, organizations including commercial, industrial, nonprofit, and government organizations or associations;
3. "Customer" means any person who uses water supplied by the Company;
4. "Water" means water supplied by the Company;

(N)

ISSUED BY

Date Filed August 4, 2004

Advice Letter No. 1169-WA

F. E. WICKS

Effective Date September 28, 2004

Decision No. _____

President

Resolution No. W-4496

Rule No. 14.1

(N)

MANDATORY WATER CONSERVATION, RESTRICTIONS AND RATIONING PROGRAM
(Continued)

Page 2

B. DEFINITIONS (Continued)

5. "Water shortage emergency" means the conditions which constitute a determination that deliveries of potable water supplies have reached a level such that continued unrestricted water use would be detrimental to the public welfare.

C. CONSERVATION – NON-ESSENTIAL OR UNAUTHORIZED WATER USE

No customer shall use Company-supplied water for non-essential or unauthorized uses as defined as follows:

1. Use of water through any connection when the Company has notified the customer in writing to repair a broken or defective plumbing, sprinkler, watering or irrigation system and the customer has failed to make such repairs within 5 days after receipt of such notice.
2. Use of water which results in flooding or run-off in gutters, waterways, patios, driveway, or streets.
3. Use of water for washing aircraft, cars, buses, boats, trailers or other vehicles without a positive shut-off nozzle on the outlet end of the hose. Exceptions include washing vehicles at commercial or fleet vehicle washing facilities operated at fixed locations where equipment using water is properly maintained to avoid wasteful use.
4. Use of water through a hose for washing buildings, structures, sidewalks, walkways, driveways, patios, parking lots, tennis courts, or other hard-surfaced areas in a manner which results in excessive run-off or waste.
5. Use of water for watering streets with trucks, except for initial wash-down for construction purposes (if street sweeping is not feasible), or to protect the health and safety of the public.
6. Use of water for construction purposes, such as consolidation of backfill, dust control, or other uses unless no other source of water or other method can be used.
7. Use of water for more than minimal landscaping in connection with any new construction.
8. Use of water for outside plants, lawn, landscape, and turf areas more often than every other day, with even numbered addresses watering on even numbered days of the month and odd numbered addresses watering on the odd numbered days of the month, except that this provision shall not apply to commercial nurseries, golf courses and other water-dependent industries.
9. Use of water for watering outside plants, lawn, landscape and turf areas during certain hours if and when specified in the applicable Schedule No. 14.1 when the schedule is in effect.
10. Use of water for watering outside plants and turf areas using a hand-held hose without a positive shut-off valve.
11. Use of water for decorative fountains or the filling or topping off of decorative lakes or ponds. Exceptions are made for those decorative fountains, lakes, or ponds which utilize recycled water.

(N)

(Continued)

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Rule No. 14.1

(N)

MANDATORY WATER CONSERVATION, RESTRICTIONS AND RATIONING PROGRAM
(Continued)

Page 3

C. CONSERVATION – NON-ESSENTIAL OR UNAUTHORIZED WATER USE (Continued)

12. Use of water for the filling or refilling of swimming pools.
13. Service of water by any restaurant except upon the request of the patron.

D. RATIONING OF WATER USE

In the event the conservation measures required by Section C are insufficient to control the water shortage, the Company shall, upon Commission approval, impose mandatory conservation and rationing. Rationing shall be in accordance with the conditions set forth in the applicable Schedule No. 14.1 as filed at the time such rationing is approved by the Commission.

Before mandatory conservation and rationing is authorized by the Commission, the Company shall hold public meetings and take all other applicable steps required by Sections 350 through 358 of the California Water Code.

E. ENFORCEMENT OF MANDATORY CONSERVATION AND RATIONING

1. The water use restrictions of the conservation program, in Section C of this rule, become mandatory when the rationing program goes into effect. These restrictions are applicable whether or not the customer exceeds the monthly water allocation.
2. The Company may, after one verbal and one written warning, install a flow-restricting device on the service line of any customer observed by Company personnel to be using water for any non-essential or unauthorized use as defined in Section C above.
3. A flow restrictor shall not restrict water delivery by greater than 50% of normal flow and shall provide the premise with a minimum of 6 Ccf/month. The restricting device may be removed only by the Company, only after a three-day period has elapsed, and only upon payment of the appropriate removal charge as set forth in the applicable Schedule No 14.1.
4. After the removal of the restricting device, if any non-essential or unauthorized use of water shall continue, the Company may install another flow-restricting device. This device shall remain in place until water supply conditions warrant its removal and until the appropriate charge for removal has been paid to the Company.
5. Each customer's water allocation shall be shown on the water bill. Water allocations may be appealed in writing as provided in Section F of this Rule. If a customer uses water in excess of the allocated amount, the utility may charge the excess usage penalty shown in the applicable Schedule No. 14.1.

(Continued)

(N)

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Resolution No. W-4496

Rule No. 14.1

MANDATORY WATER CONSERVATION, RESTRICTIONS AND RATIONING PROGRAM
(Continued)

(N)

Page 4

E. ENFORCEMENT OF MANDATORY CONSERVATION AND RATIONING (Continued)

6. Any money collected by the Company through water use violation fines shall not be accounted for as income, but shall be accumulated by the Company in a separate account for disposition as directed or authorized from time to time by the Commission.
7. The charge for removal of a flow-restricting device shall be in accordance with the applicable Schedule No. 14.1.

F. APPEAL PROCEDURE

Any customer who seeks a variance from any of the provisions of this water conservation and rationing plan shall notify the Company in writing, explaining in detail the reason for such a variation. The Company shall respond to each such request.

Any customer not satisfied with the Company's response may file an appeal with the staff of the Commission. The customer and the Company will be notified of the disposition of such appeal by letter from the Executive Director of the Commission.

If the customer disagrees with such disposition, the customer shall have the right to file a formal complaint with the Commission. Except as set forth in this Section, no person shall have any right or claim in law or in equity, against the Company because of, or as a result of, any matter or thing done or threatened to be done pursuant to the provisions of this water conservation and rationing plan.

G. PUBLICITY

In the event the Company finds it necessary to implement this plan, it shall notify customers and hold public hearings concerning the water supply situation, in accordance with Chapter 3, Water Shortage Emergencies, Section 350 through 358, of the California Water Code. The Company shall also provide each customer with a copy of this plan by means of billing inserts or special mailings; notifications shall take place prior to imposing any fines associated with this plan. In addition, the Company shall provide customers with periodic updates regarding its water supply status and the results of customers' conservation efforts. Updates may be by bill insert, special mailing, poster, flyer, newspaper, television or radio spot/advertisement, community bulletin board, or other appropriate methods.

(N)

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Decision No. _____

President

Resolution No. W-4496

Appendix G
Rate Schedule

Schedule No. AC-1
Arden-Cordova District
GENERAL METERED SERVICE

APPLICABILITY

Applicable to all general metered water service.

TERRITORY

Arden Manor area located approximately six miles northeast of Sacramento and Rancho Cordova and vicinity, Sacramento County.

RATES

Quantity Rate:
For all water delivered, per 100 cu. ft..... \$ 0.461

Service Charges:	Per Meter Per Month
For 5/8 x 3/4-inch meter.....	\$ 7.70
For 3/4-inch meter.....	11.55
For 1-inch meter.....	19.20
For 1 1/2 inch meter.....	38.40
For 2-inch meter.....	61.50
For 3-inch meter.....	115.00
For 4-inch meter.....	192.00
For 6-inch meter.....	384.00
For 8-inch meter.....	615.00
For 10-inch meter.....	884.00

The Service Charge is a readiness-to-serve charge applicable to all metered service and to which is added the charge for water used computed at the Quantity Rate.

SPECIAL CONDITIONS

1. All bills are subject to the reimbursement fee set forth on Schedule No. UF.
2. Service with 5/8 x 3/4-inch meters and 3/4-inch meters is available only to customers served with 5/8 x 3/4-inch and 3/4-inch meters as of May 31, 1995.
3. As authorized by the California Public Utilities Commission in Decision 04-03-039, all bills are subject to a surcredit of \$0.0788 per Ccf for a 9-year amortization period, beginning May 6, 2004 on the effective date of Advice Letter 1150-W. This surcredit will refund the ratepayer portion of the revenues collected from the City of Folsom for the period of July 1, 1994 through March 16, 2004. (D)
4. Pursuant to Decision 04-08-052, a surcharge of \$0.0058 per Ccf is to be added to the Quantity Rate for a 12-month period, beginning with the effective date of Advice Letter 1183-W, which is January 9, 2005 to recover the difference between the interim rates and actual rates for the period of January 1, 2004 through September 2, 2004.
5. As authorized by the California Public Utilities Commission, an amount of \$0.0271 per Ccf is to be added to the Quantity Rate for a period of 12 months, beginning on June 21, 2005 the effective date of Advice Letter 1153-W. This surcharge will recover the undercollection in the Supply Cost Balancing Account, for the period of November 29, 2001 through December 31, 2002.
6. As authorized by the California Public Utilities Commission, an amount of \$0.0249 per Ccf is to be added to the Quantity Rate for a period of 12 months, beginning on June 21, 2005, the effective date of Advice Letter 1156-W. This surcharge will recover the undercollection in the Supply Cost Balancing Account for the period of January 1, 2003 through December 31, 2003.
7. As authorized by the California Public Utilities Commission, an amount of \$0.0230 per Ccf is to be added to the Quantity Rate for a period of 12 months, beginning on August 25, 2005, the effective date of Advice Letter 1189-W. This surcharge will recover the undercollection in the Balancing-Type Memorandum Account, as of December 31, 2004.
8. Pursuant to Decision 05-07-045, to recover the balance as of January 31, 2005 in the Water Quality Litigation Memorandum Account, a surcharge of \$0.12 per Ccf is to be added to the quantity rate for 20 years. The surcharge amount will be recalculated once in every rate cycle, or more frequently if in any year the receipt of Water Availability Fee (WAF) monies will permit a reduction of \$0.50 or more in the monthly bill under Tariff AC-2. (N)
(N)
(N)
(N)

ISSUED BY

Date Filed September 16, 2005

Advice Letter No. 1197-W

F. E. WICKS

Effective Date September 22, 2005

Decision No. 05-07-045

President

Resolution No. _____

Schedule No. AC-2

Arden-Cordova District

FLAT RATE SERVICE

APPLICABILITY

Applicable to all flat rate water service. This schedule is closed to new installations.

TERRITORY

Arden Manor area located approximately six miles northeast of Sacramento and Rancho Cordova and vicinity, Sacramento County.

RATES

	<u>Per Service Connection Per Month</u>
For a single unit of occupancy, including premises not exceeding 12,000 sq. ft. in area.....	\$ 31.70
For a duplex including premises not exceeding 12,000 sq. ft. in area.....	\$ 63.20
a. For each additional detached unit of occupancy on the same premises and served from the same service connection.....	\$ 31.70
b. For each swimming pool equipped with a re-circulating filter system, on the same premises and served from the same service connection.....	\$ 7.10

SPECIAL CONDITIONS

1. The above flat rates apply to service connections not larger than one inch in diameter.
2. For service covered by the above classification, if either the utility or the customer so elects, a meter shall be installed and service provided under Schedule No. AC-1, General Metered Service.
3. All bills are subject to the reimbursement fee set forth on Schedule No. UF. (D)
4. As authorized by the California Public Utilities Commission in Decision 04-03-039, all bills are subject to a surcredit \$2.19 per month for a 9-year amortization period, beginning May 6, 2004, the effective date of Advice Letter 1150-W. This surcredit will refund the ratepayer portion of the revenues collected from the City of Folsom for the period of July 1, 1994 through March 16, 2004.
5. Pursuant to Decision 04-08-052, a surcharge of \$0.2295 is to be added to the monthly service connection charge for a 12-month period, beginning with the effective date of Advice Letter No. 1183-W which is January 9, 2005 to recover the difference between the interim rates and actual rates for the period of January 1, 2004 through September 2, 2004.
6. As authorized by the California Public Utilities Commission, an amount of \$0.77 will be added to monthly service connection charge for a period of 12 months, beginning on the effective date of Advice Letter 1153-W which is June 21, 2005. This surcharge will recover the undercollection in the Supply Cost Balancing Account, for the period of November 29, 2001 through December 31, 2002.
7. As authorized by the California Public Utilities Commission, an amount of \$0.71 will be added to monthly service connection charge for a period of 12 months, beginning on the effective date of Advice Letter 1156-W, which is June 21, 2005. This surcharge will recover the undercollection in the Supply Cost Balancing Account, for the period of January 1, 2003 through December 31, 2003.
8. As authorized by the California Public Utilities Commission, an amount of \$0.65 per meter, per month is to be added to the monthly service connection for a period of 12 months, beginning on August 25, 2005, the effective date of Advice Letter 1189-W. This surcharge will recover the undercollection in the Balancing-Type Memorandum Account, as of December 31, 2004.
9. Pursuant to Decision 05-07-045, to recover the balance as of January 31, 2005 in the Water Quality Litigation Memorandum Account, a surcharge of \$4.72 is to be added to the monthly service connection charge for 20 years. The surcharge amount will be recalculated once in every rate cycle, or more frequently if in any year the receipt of Water Availability Fee (WAF) monies permit a reduction of \$0.50 or more in the monthly bill under this tariff schedule. (N)
(N)
(N)
(N)

ISSUED BY

Date Filed September 16, 2005

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F. E. WICKS

Effective Date September 22, 2005

Decision No. 05-07-045

President

Resolution No. _____

Schedule No. AC-3

Arden-Cordova District

WATER CONSERVATION PENALTIES

APPLICABILITY

This schedule applies to all customers of the Cordova system of the Arden-Cordova Water District who violate the provisions of Rule 14.1.

TERRITORY

Rancho Cordova, Sacramento County.

PENALTY CHARGES

For the first offense No Charge

For each additional offense \$200.00

The penalty charge is for two or more offenses of not adhering to the conservation measures set forth in Phases II and III of Rule 14.1.

(Continued)

ISSUED BY

Date Filed Jul 16 1998

Advice Letter No. 1036-W

F. E. WICKS

Effective Date Sep 8 1998

Decision No. _____

Resolution No. W4111

Southern California Water Company
630 East Foothill Boulevard
San Dimas, California 91773

Original CPUC Sheet No. 4155-W

Canceling _____ CPUC Sheet No. _____

Schedule No. AC-3

Arden-Cordova District

WATER CONSERVATION PENALTIES

(Continued)

SPECIAL CONDITIONS

1. Penalty charges must be separately identified on each bill.
2. This tariff shall remain in effect as long as Rule 14.1 is in effect for the Arden-Cordova District.
3. All penalties are subject to the reimbursement set forth in Schedule No. UF.

ISSUED BY

Date Filed Jul 16 1998

Advice Letter No. 1036-W

F. E. WICKS

Effective Date Sep 8 1998

Decision No. _____

Resolution No. W4111

Appendix H
Responses to Public Comments

No Public Comments received during Public Review Period.

Appendix I
Groundwater Basin Water Rights
Stipulation/Judgment

Appendix I

There is no Groundwater Basin Water Rights Stipulation/Judgment for Cordova System. However, a copy of the Groundwater Management Plan is available at:

Cordova Customer Service Office
Golden State Water Company
3035 Prospect Park Drive, Suite 50
Rancho Cordova, CA 95670

Appendix J
Summary of Population Based on Census Data

Appendix J: Demographic Information for Cordova System

Table J-1: Census Tracts within the Cordova System

County	Minor Zone	Percentage of Minor Zone in the System
Sacramento County	787130	90%
Sacramento County	789420	100%
Sacramento County	789400	100%
Sacramento County	787140	100%
Sacramento County	789800	100%
Sacramento County	789700	100%
Sacramento County	787150	25%
Sacramento County	789810	100%
Sacramento County	789410	100%
Sacramento County	789500	100%
Sacramento County	790350	100%
Sacramento County	789300	90%
Sacramento County	790310	100%
Sacramento County	790340	100%
Sacramento County	790300	100%
Sacramento County	790330	25%
Sacramento County	790323	100%
Sacramento County	790322	100%
Sacramento County	790321	100%

Table J-2: Population, Household and Employment Projections for Year 2000, 2005, 2010, 2015, 2020, 2025 and 2030 for Cordova System
Cordova System Population, Household and Employment Estimates for 2000

County	Minor Zone Number	Total Population	Number of Households	Total Employees
Sacramento County	787130	6,554	2,622	2,092
Sacramento County	789420	666	267	3,526
Sacramento County	789400	5	2	7,402
Sacramento County	787140	3,838	1,385	711
Sacramento County	789800	3,676	1,299	214
Sacramento County	789700	896	288	424
Sacramento County	787150	3,512	337	128
Sacramento County	789810	4,894	1,795	877
Sacramento County	789410	4,723	1,965	832
Sacramento County	789500	4,790	2,165	703
Sacramento County	790350	0	0	846
Sacramento County	789300	1,277	446	180
Sacramento County	790310	20	9	12,764
Sacramento County	790340	3,300	1,777	7,881
Sacramento County	790300	0	0	5,178
Sacramento County	790330	0	0	304
Sacramento County	790323	3,321	1,259	232
Sacramento County	790322	0	0	2,181
Sacramento County	790321	0	0	4,215

Cordova System Population, Household and Employment Estimates for 2005

County	Minor Zone Number	Total Population	Number of Households	Total Employees
Sacramento County	787130	6,583	2,453	2,850
Sacramento County	789420	4,349	1,563	409
Sacramento County	789400	4,609	1,511	220
Sacramento County	787140	824	309	3,086
Sacramento County	789800	5,927	2,482	637
Sacramento County	789700	5,846	2,193	726
Sacramento County	787150	2	1	1,777
Sacramento County	789810	0	0	667
Sacramento County	789410	1,116	319	416
Sacramento County	789500	6,056	2,055	669
Sacramento County	790350	0	0	3,097
Sacramento County	789300	4,286	1,432	586
Sacramento County	790310	25	10	9,002
Sacramento County	790340	0	0	1,711
Sacramento County	790300	1,580	568	168
Sacramento County	790330	1,027	355	48
Sacramento County	790323	2,306	718	1,417
Sacramento County	790322	0	0	3,414
Sacramento County	790321	4,083	1,914	5,448

Cordova System Population, Household and Employment Estimates for 2010

County	Minor Zone Number	Total Population	Number of Households	Total Employees
Sacramento County	787130	6,554	2,499	2,092
Sacramento County	789420	4,565	1,625	473
Sacramento County	789400	4,870	1,571	252
Sacramento County	787140	864	322	3,527
Sacramento County	789800	6,214	2,580	724
Sacramento County	789700	6,133	2,280	847
Sacramento County	787150	2	1	1,930
Sacramento County	789810	0	0	784
Sacramento County	789410	1,179	331	465
Sacramento County	789500	6,353	2,137	823
Sacramento County	790350	0	0	3,632
Sacramento County	789300	4,522	1,499	698
Sacramento County	790310	26	10	10,597
Sacramento County	790340	0	0	2,002
Sacramento County	790300	1,657	591	191
Sacramento County	790330	1,077	369	57
Sacramento County	790323	4,887	1,577	3,749
Sacramento County	790322	0	0	4,248
Sacramento County	790321	4,281	1,990	7,121

Cordova System Population, Household and Employment Estimates for 2015

County	Minor Zone Number	Total Population	Number of Households	Total Employees
Sacramento County	787130	6,909	2,605	1,758
Sacramento County	789420	3,710	1,364	485
Sacramento County	789400	3,994	1,318	245
Sacramento County	787140	702	270	3,668
Sacramento County	789800	5,050	2,166	726
Sacramento County	789700	4,985	1,914	871
Sacramento County	787150	1	1	1,949
Sacramento County	789810	0	0	825
Sacramento County	789410	958	278	443
Sacramento County	789500	5,163	1,794	863
Sacramento County	790350	0	0	3,899
Sacramento County	789300	3,675	1,259	741
Sacramento County	790310	21	8	11,569
Sacramento County	790340	0	0	2,028
Sacramento County	790300	1,346	496	191
Sacramento County	790330	875	310	58
Sacramento County	790323	5,129	1,750	5,675
Sacramento County	790322	0	0	4,846
Sacramento County	790321	3,479	1,671	7,807

Cordova System Population, Household and Employment Estimates for 2020

County	Minor Zone Number	Total Population	Number of Households	Total Employees
Sacramento County	787130	6,789	2,596	1,936
Sacramento County	789420	3,645	1,359	527
Sacramento County	789400	3,924	1,314	270
Sacramento County	787140	690	269	4,017
Sacramento County	789800	4,962	2,158	803
Sacramento County	789700	4,898	1,907	957
Sacramento County	787150	1	1	2,081
Sacramento County	789810	0	0	915
Sacramento County	789410	942	277	499
Sacramento County	789500	5,073	1,787	971
Sacramento County	790350	0	0	4,330
Sacramento County	789300	3,611	1,255	800
Sacramento County	790310	21	8	12,968
Sacramento County	790340	0	0	2,181
Sacramento County	790300	1,323	494	205
Sacramento County	790330	860	309	65
Sacramento County	790323	6,213	2,124	6,960
Sacramento County	790322	0	0	5,507
Sacramento County	790321	3,418	1,665	8,655

Cordova System Population, Household and Employment Estimates for 2025

County	Minor Zone Number	Total Population	Number of Households	Total Employees
Sacramento County	787130	6,554	2,499	2,092
Sacramento County	789420	3,582	1,432	556
Sacramento County	789400	3,855	1,384	296
Sacramento County	787140	678	283	4,341
Sacramento County	789800	4,875	2,273	872
Sacramento County	789700	4,812	2,008	1,044
Sacramento County	787150	1	1	2,241
Sacramento County	789810	0	0	979
Sacramento County	789410	925	292	567
Sacramento County	789500	4,984	1,882	1,080
Sacramento County	790350	0	0	4,834
Sacramento County	789300	3,548	1,321	827
Sacramento County	790310	20	9	14,614
Sacramento County	790340	0	0	2,313
Sacramento County	790300	1,300	521	212
Sacramento County	790330	845	326	72
Sacramento County	790323	6,105	2,237	7,640
Sacramento County	790322	0	0	6,262
Sacramento County	790321	3,359	1,753	10,052