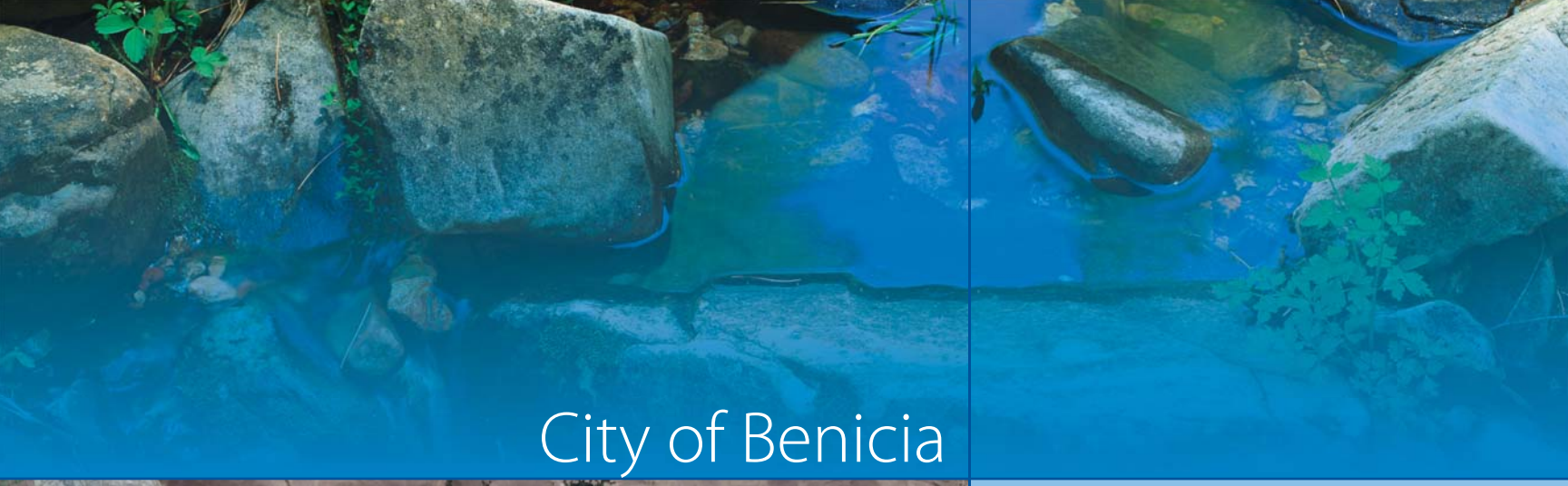
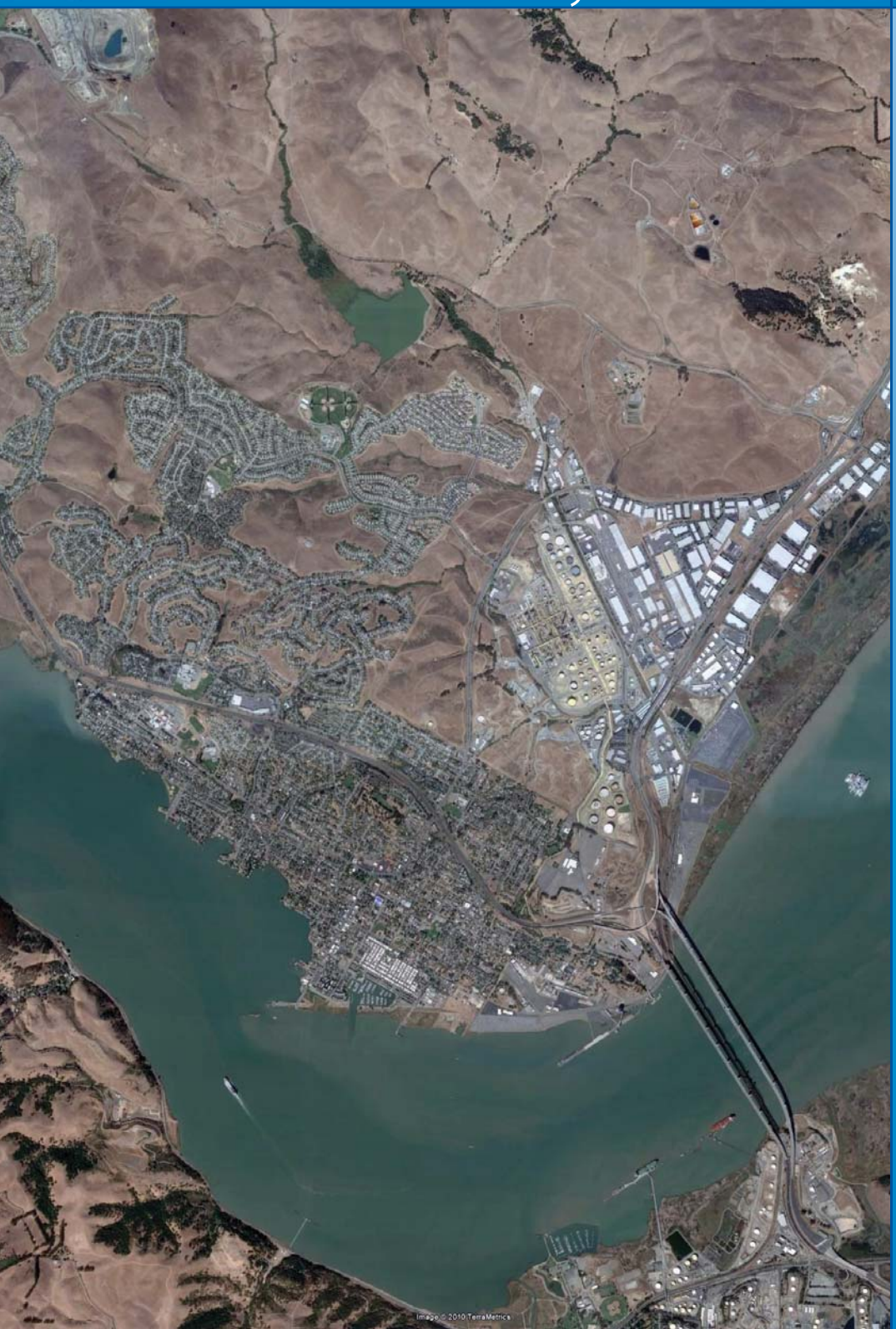


City of Benicia



Final

2010 Urban Water Management Plan

June 2011

CDM

Table of Contents

Executive Summary .....Separate Document

Section 1 Introduction 1-1

1.1 Urban Water Management Planning Act 1-1

1.2 Law 1-1

1.2.1 Changes in the Act Since 2005 1-2

1.2.2 Senate Bill 7 1-3

1.3 Integrated Resource Management 1-3

1.4 Public Participation 1-5

1.4.1 Community Sustainability Commission 1-5

1.4.2 Agency Coordination 1-5

1.4.3 Public Hearing 1-6

1.5 Plan Adoption 1-6

Section 2 System Description 2-1

2.1 Law 2-1

2.2 City Background 2-1

2.2.1 History and Government 2-1

2.2.2 Watershed Characteristics 2-1

2.3 Climate Characteristics 2-4

2.4 Demographic Characteristics 2-5

Section 3 Water Demands 3-1

3.1 Law 3-1

3.2 Service Area Demands 3-2

3.2.1 Treated Water Demands 3-2

3.2.2 Untreated Water Demands 3-4

3.2.3 Total Water Demand 3-4

3.3 Low-Income Water Demand 3-5

3.4 Water Conservation Bill Requirements 3-6

3.4.1 Baseline Gross per Capita Demand 3-6

3.4.2 Urban Water Use Target 3-8

3.4.3 Method for Demonstrating Compliance with the Water Conservation Bill Requirements 3-10

3.5 Potential Additional Conservation Measures 3-12

Section 4 Water Supply Sources 4-1
4.1 Law 4-1
4.2 Introduction 4-3
4.3 Major City Water Facilities 4-4
4.3.1 Raw (Untreated) Water Conveyance 4-5
4.3.2 Raw Water Reservoir (Lake Herman) 4-5
4.3.3 Water Treatment Plant 4-5
4.3.4 Treated Water Distribution System 4-6
4.4 Water Supply Contracts 4-6
4.4.1 State Water Project 4-6
4.4.2 Water Rights Settlement 4-7
4.4.3 Lake Herman 4-8
4.4.4 Vallejo Agreement (Solano Project Water) 4-8
4.4.5 Solano Irrigation District 4-8
4.4.6 Mojave Banking and Water Exchange 4-9
4.5 Other Water Sources 4-9
4.5.1 Transfer or Exchange Opportunities 4-9
4.5.2 Groundwater 4-10
4.5.3 Indirect Potable Water Reuse 4-10
4.5.4 Desalinated Water 4-10
4.5.5 Recycled Water 4-10
4.5.6 Potential Future Water Supply and Storage Opportunities 4-11

Section 5 Water Supply Reliability and Shortage Contingency Plan 5-1
5.1 Law 5-1
5.2 Introduction 5-2
5.3 Water Reliability by Source 5-3
5.3.1 State Water Project 5-3
5.3.2 Settlement Water 5-5
5.3.3 Lake Herman 5-6
5.3.4 Solano Project 5-6
5.3.5 Mojave Banking and Water Exchange 5-7
5.4 Water Reliability by Categorical Year Type 5-7
5.5 Water Quality 5-9
5.6 Water Shortage Contingency Plan 5-10
5.6.1 Potential Catastrophic Events 5-10
5.6.2 Priorities for Water Use 5-11
5.6.3 Stages of Action 5-12
5.6.4 Penalties for Excess Water Use 5-14
5.6.5 Revenue and Expenditure Impacts 5-16
5.6.6 Emergency Preparedness 5-17

Section 6 Water Demand Management Measures 6-1
6.1 Law 6-1
6.2 Overview of Implementation Status 6-2
6.3 Fully Implemented Measures 6-3
6.3.1 System Water Audits, Leak Detection and Repair (DMM C) 6-3

6.3.2 Metering with Commodity Rates (DMM D) 6-3
6.3.3 High-Efficiency Washing Machine Rebate Programs (DMM F) 6-4
6.3.4 Public Information Programs (DMM G) 6-4
6.3.5 School Education Programs (DMM H) 6-4
6.3.6 Conservation Pricing (DMM K) 6-4
6.3.7 Water Conservation Coordinator (DMM L) 6-4
6.3.8 Water Waste Prohibition (DMM M) 6-5
6.4 Partially Implemented Measures 6-5
6.4.1 Water Survey Programs for Single-Family Residential and Multi-Family Residential Customers (DMM A) 6-5
6.4.2 Residential Plumbing Retrofits (DMM B) 6-5
6.4.3 Large Landscape Conservation Programs (DMM E) 6-6
6.4.4 Conservation Programs for Commercial, Industrial, and Institutional Accounts (DMM I) 6-6
6.4.5 Residential Ultra-Low-Flush Toilet (ULFT) Replacement Programs (DMM N) 6-7

Appendices

A Ahwanhee Water Principles for Resource Efficient Land Use
B Public Involvement Materials
B-1 Notices of UWMP Preparation
B-2 Notice of Public Hearing
B-3 Public Hearing Agenda
B-4 Public Hearing Minutes
C UWMP Adoption Resolution
D Urban Water Management Plan Checklist
E SWP Reliability Estimates (SCWA)
F Settlement Water Reliability Analysis (CH2M-Hill)
G Solano Project Reliability Estimates (SCWA)
H Emergency Water Conservation Plan
I 2009/2010 CUWCC Best Management Practices Reports
I-1 CUWCC BMP Coverage Reports
I-2 City of Benicia 2009 BMP Reports
I-3 City of Benicia 2010 BMP Reports
J City of Benicia BMP Exemption Application Analysis (M-Cubed)

List of Tables

1-1 Agency and Public Coordination Efforts 1-5
2-1 Climate Data 2-4
2-2 Population and Housing Unit Forecast from 2010-2035 2-5
3-1 Treated Water Meters and Consumption for 2005 and 2010 3-3
3-2 Projected Treated Water Meters and Consumption for 2015 - 2035 3-3
3-3 Historical and Projected Untreated Water Deliveries for 2010 - 2035 3-4
3-4 Historical and Projected Total Water Demand for 2010- 2035 3-5
3-5 Current and Projected Water Demands for Low-Income Customers 3-5

3-6 Computation of Baseline Per Capita Water Demand for the City....3-7
3-7 Computation of Minimum Water Use Reduction Target for the City....3-8
3-8 Method 2 Computation of 20x2020 Target for the City....3-10
3-9 Computation of Demand Reduction Needed to Comply with the Water Conservation Bill....3-12
4-1 Current Supply Amounts by Contract or Water Rights....4-6
5-1 Factors Influencing Water Supply Reliability....5-3
5-2 Estimated Minimum Water Supply Over the Next Three Years....5-3
5-3 Reliability Factors for the City's Settlement Water....5-6
5-4 Reliability Factors for the City's Solano Project....5-7
5-5 Water Supply and Demand Comparison for a Normal Hydrologic Condition....5-8
5-6 Water Supply and Demand Comparison for a Single-Dry Year Hydrologic Condition....5-8
5-7 Water Supply and Demand Comparison for a Multiple-Dry Year Hydrologic Condition....5-9
5-8 Water Shortage Contingency Stages of Action....5-12
5-9 Water Use Prohibitions....5-14
5-10 Current Threshold Amounts for Water Use Penalties....5-14
5-11 Recommended Baseline Amounts for Water Use Penalties....5-15
5-12 Excess Water Use Penalties....5-16
6-1 Summary of Demand Management Measure Implementation....6-3

List of Figures

2-1 Location Map....2-2
2-2 Drainage Areas....2-3
3-1 Historical Water Use vs. Future Targets....3-11
3-2 Evapotranspiration Data 1995-2010....3-11
4-1 City of Benicia Water Sources....4-3
4-2 Water Conveyance System....4-4
5-1 Probability Curve Showing Reliability of the City's Portion of the SCWA Table A Allocation Based on the DWR 2009 Reliability Report....5-4

List of Abbreviations

ABAG	Association of Bay Area Governments
Act	Urban Water Management Planning Act
AF	acre-foot or acre-feet
AFY	acre-feet per year
AHU	affordable housing unit
BMP	best management practice
CAP	Climate Action Plan
CII	commercial, industrial, and institutional
City	City of Benicia
CSC	Community Sustainability Commission
CUWCC	California Urban Water Conservation Council
CVP	Central Valley Project
DMM	demand management measures
DWR	California Department of Water Resources
ET	evapotranspiration
GCM	general circulation model
gpcd	gallons per capita per day
gpd	gallons per day
gpf	gallon per flush
HET	high efficiency toilet
HEW	high-efficiency washing
IRWMP	Integrated Regional Water Management Plan
MAWA	Maximum Applied Water Allowance
mgd	million gallons per day
Mojave	Mojave Water Agency
MOU	Memorandum of Understanding
MWELO	Model Water Efficient Landscape Ordinance
NBA	North Bay Aqueduct
SCWA	Solano County Water Agency
SID	Solano Irrigation District
SVI	Sacramento Valley Index
SWA	Solano Water Authority
SWP	State Water Project
SWRCB	State Water Resources Control Board
WTP	water treatment plant
WWTP	wastewater treatment plant
ULFT	ultra-low flow toilet
UWMP	Urban Water Management Plan

Reference Web-Links

City of Benicia website:
http://www.ci.benicia.ca.us
City of Benicia Climate Action Plan:
http://www.ci.benicia.ca.us/index.asp?Type=B_BASIC&SEC={19078EB3-2602-4764-A04F-28A14001A918}&DE={015EF02D-6AC8-471C-88AB-3710BE5CDF2D}
Solano Couty Urban Water Management Plan:
http://www.scwa2.com/UWMP_ScwaPlan.aspx#
Solano County Integrated Regional Water Management Plan:
http://www.scwa2.com/UWMP_IRWMP.aspx
Bay Area Integrated Regional Water Management Plan:
http://www.bairwmp.org/
DWR Urban Water Management:
http://www.water.ca.gov/urbanwatermanagement/
DWR California Water Plan Update 2009:
http://www.waterplan.water.ca.gov/cwpu2009/index.cfm
DWR Flood Management White Paper:
http://www.water.ca.gov/pubs/flood/flood_warnings_responding_to_california's_flood_crisis/011005floodwarnings.pdf
DWR Integrated Regional Water Management Program:
http://www.water.ca.gov/irwm/index.cfm
Association of Bay Area Governments (ABAG) Earthquake and Hazards Program:
http://quake.abag.ca.gov/mitigation/

Acknowledgements

The valuable contributions of many participants are acknowledged in successfully completing the 2010 Urban Water Management Plan. The City's Community Sustainability Commission (CSC), and in particular Work Group 4, provided key input and comments throughout the project. CSC members included:

- Constance Beutel
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- Kathy Kerridge
- Larry Lamoreux
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- Emmalyn Tringali
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- Todd Lopez
- Randall Scott (Work Group 4)
- Rosie Switzer
- Former member Gene Doherty (Work Group 4)

Work Group 4 met with City staff and its consultants for a kickoff meeting and reviewed the Administrative Draft UWMP. The CSC reviewed the Draft UWMP and provided input at their March 21, 2011 and May 16, 2011 meetings.

In addition, the following City of Benicia staff members were actively involved in all aspects of the plan development and report preparation:

- Melissa Morton, Interim Assistant Director of Public Works and Utilities Manager
- Chris Tomasik, Former Assistant Director of Public Works and Utilities Manager
- Carrie Wenslawski, Utilities Division Management Analyst
- Dave Wenslawski, Water Quality Technician

Section 1
Introduction

1.1 Urban Water Management Planning Act

All urban water suppliers within the State of California are required to prepare Urban Water Management Plans. California Water Code Sections 10610 through 10657 detail the information that must be included in these plans as well as who must file them. This plan satisfies the requirements of the Urban Water Management Planning Act (the Act) of 1983 and the subsequent amendments to the Act. According to the Act, an urban water supplier is defined as a supplier, either publicly or privately owned, that provides 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.

This report constitutes the City of Benicia's (City's) 2010 Urban Water Management Plan (UWMP). Urban water suppliers are required to update their UWMPs at least once every five years on or before December 31, in years ending in five and zero. For the 2010 UWMPs, California has extended the UWMP adoption deadline to July 1, 2011. This UWMP shall be adopted by the City and submitted to the California Department of Water Resources (DWR). The UWMP requires analyses of management tools and options that will maximize resources and minimize the need to import water from other regions. UWMPs require, and this UWMP includes: an analysis of total projected water use compared to water supply sources over at least the next 20 years in five-year increments; a discussion of water quality, as it affects water management strategies and supply reliability; and water demand and supply information compared for single dry year and multiple dry year scenarios.

1.2 Law

10620 (d) (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.

10621 (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.

10621 (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).

10635 (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.

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. After the hearing, the plan shall be adopted as prepared or as modified after the hearing.

1.2.1 Changes in the Act Since 2005

Since 2005, several amendments have been added to the Act. Some of the amendments provided for reporting on lower income and affordable household water projections, eligibility for state water management grants or loans, and reporting on the feasibility of serving recycled water demands. The following is a summary of the significant changes in the Act that have occurred from 2005 to the present:

- Clarifies that every urban water supplier preparing a plan must give at least 60 days advance notice to any city or county prior to the public hearing on the UWMP within which the supplier provides water supplies to allow opportunity for consultation on the proposed plan (Water Code § 10621(b)).
- Requires urban retail water suppliers to include baseline daily per capita water use, urban water use targets, interim urban water use targets, and compliance daily per capita water use, along with the basis for determining those estimates, including references to supporting data.
- Requires plan by retail water suppliers to include water use projections for single-family and multi-family residential housing needed for lower income and affordable households to assist with compliance with the existing requirement under Section 65589.7 of the Government Code that suppliers grant a priority for the provision of service to housing units affordable to lower income households (Water Code § 10631.1).
- Conditions eligibility for a water management grant or loan made to an urban water supplier and awarded or administered by DWR, the State Water Resources Control Board, or the California Bay-Delta Authority or its successor agency on the implementation of water demand management measures, including consideration of the extent of compliance with the conservation measures described in the California Urban Water Conservation Council's (CUWCC) Memorandum of Understanding (MOU) Regarding Urban Water Conservation in California (Water Code § 10631.5).
- Exempts projects funded by the American Recovery and Reinvestment Act of 2009 from the conditions placed on state funding for water management to urban water suppliers (Water Code § 10631.5(a)(2)).
- Requires DWR, in consultation with the State Water Resources Control Board and the California Bay-Delta Authority or its successor agency, to develop eligibility requirements to implement the foregoing grant and loan conditions (Water Code § 10631.5(b)).
- Repeals existing grant funding conditions of state water management grants or loans on July 1, 2016 if the UWMP is not extended or altered prior to this date (Water Code § 10631.5(f)).
- Deems water suppliers that are members of the CUWCC and comply with the MOU, as it may be amended, to be in compliance with the requirement to describe the supplier's water demand management measures in its urban water management plan (Water Code § 10631(j)).
- Required DWR, in consultation with the CUWCC, to convene a technical panel, no later than January 1, 2009, to provide information and recommendations to the Department and the Legislature on new demand management measures, technologies, and approaches. The panel and DWR were to

report to the Legislature on their findings no later than January 1, 2010 and each five years thereafter (Water Code § 10631.7.3).

- Clarifies that "indirect potable reuse" of recycled water should be described and quantified in the plan, including a determination with regard to the technical and economic feasibility of serving those uses (Water Code § 10633(d)).
- Requires DWR to recognize exemplary efforts by water suppliers by obligating DWR to identify and report to the technical panel, described above, any "exemplary elements" of individual water suppliers' plans, meaning any water demand management measures adopted and implemented by specific urban water suppliers that achieve water savings significantly above the levels required to meet the conditions to state grant or loan funding (Water Code § 10644(c)).

1.2.2 Senate Bill 7

In addition to changes to the Act, the State Legislature passed Senate Bill 7 as part of the Seventh Extraordinary Session, referred to as SBX7-7, on November 10, 2009, which became effective February 3, 2010. This new law was the water conservation component to the historic Delta legislative package, and seeks to achieve a 20 percent state-wide reduction in urban per capita water use by December 31, 2020. This implements similar 2008 water use reduction goals. The law will require each urban retail water supplier to develop urban water use targets to help meet the 20 percent goal by 2020, and an interim urban water reduction target of 10 percent by 2015.

The bill states that the legislative intent is to require all water suppliers to increase the efficiency of use of water resources and to establish a framework to meet the state targets for urban water conservation. The bill establishes methods for urban retail water suppliers to determine targets to help achieve increased water use efficiency by the year 2020. The law is intended to promote urban water conservation standards consistent with the CUWCC's adopted best management practices.

Additionally, the bill includes reporting requirements in the upcoming UWMPs. Specifically, urban retail water suppliers must include in their 2010 UWMPs the following information from their target-setting process: (1) baseline daily per capita water use; (2) urban water use target; (3) interim water use target; and (4) compliance daily per capita water use, including technical bases and supporting data for those determinations. An urban retail water supplier may update its 2020 urban water use target in its 2015 UWMP (Water Code § 10608.20).

To give retail urban water suppliers time to conduct the additional required analyses, SBX7-7 grants an extension for adoption of UWMPs due in 2010 to July 1, 2011 (Water Code § 10608.20(j)). Urban retail water suppliers, such as the City, are to prepare a plan for implementing the Water Conservation Bill requirements and discuss this implementation plan at a public meeting (Water Code § 10608.26).

1.3 Integrated Resource Management

The California Water Plan Update 2009, prepared by DWR, provides an overall strategy framework to guide water planning on a state-wide basis. The California Water Plan Update identifies 28 strategies to help meet regional water management objectives in the context of broader integrated resource management. These strategies include water use efficiency, recycling, desalination, and storage; water quality improvement; management of flood risks, runoff, and watersheds; land use and agricultural land stewardship; and ecosystem restoration.

The California Water Plan Update 2009 encourages integrated water resource planning to build balanced water portfolios that increase water use efficiency and maximize the return on investment in sound water management policies. A diverse portfolio of water management strategies provides flexibility to handle changing and uncertain future conditions. Each region chooses an appropriate mix of resource management strategies and objectives based on its own objectives and goals.

The City is committed to using all its resources efficiently, including water. The City is an active participant in ongoing regional (Solano County) water planning efforts focused on integrating all aspects of water resource management including water supply, water quality, wastewater treatment/recycling, flood control, watershed planning, and environmental programs. This UWMP incorporates the regional planning information relevant to the City. In particular, the UWMP specifically addresses urban water use efficiency and discusses demand management measures for water conservation that are discussed in the California Water Plan.

The integrated resource management plans prepared by many regional associations of water agencies in response to California Water Plan guidance address the portfolio of water management strategies appropriate for each region. DWR's Integrated Regional Water Management Program is enabled by several pieces of legislation: Integrated Regional Water Management Planning Act (Water Code § 10530-10550); Proposition 50: Chapter 8 Integrated Regional Water Management (Water Code § 79500-79590); Proposition 84: Chapter 2 Integrated Regional Water Management (Public Resource Code § 75001-75130); and Proposition 1E: Article 4 Integrated Regional Water Management (Public Resource Code § 5096.800-5096.967).

The Solano County Water Agency's (SCWA's) Integrated Regional Water Management Plan (IRWMP), developed with the City's participation, is one of these regional efforts. The first phase of the IRWMP documented existing SCWA programs and summarized individual member agency water supplies and current demands. The second phase of the regional plan evaluated potential future water management measures and provided guidance on future programs and direction for the SCWA.

In 2009, as part of the Bay Area IRWMP's Regional Acceptance Process, SCWA indicated that the portion of Solano County that is within the Bay Area IRWMP region (which consists of the majority of the nine-county Bay Area) will collaborate with the Bay Area IRWMP in the development and prioritization of water resources management projects. Numerous water agencies, wastewater, flood protection, and land use agencies, and many non-profit groups are part of this IRWMP effort. SCWA will not be updating its own IRWMP.

The Bay Area Water Forum is a regional group of water agencies and stakeholders that focuses in particular on water issues affecting the Bay Area and the Sacramento-San Joaquin Delta. The Forum also functions as the public outreach mechanism for the Bay Area IRWMP. It may be part of the future governance organization that DWR continues to seek to have better definition from the Bay Area. The Forum has encouraged all Bay Area jurisdictions to consider a set of water and land use principles as part of land use and water resource planning. Appendix A contains a copy of the "Ahwanhee Water Principles for Resource Efficient Land Use".

Many of the Ahwanhee Principles are addressed by a community's General Plan, which encompasses all aspects of community planning. The City's General Plan guides land use and development policies. Ahwanhee Principles that the City could consider incorporating into its General Plan and/or land use planning efforts, with guidance from the Planning Division, to encourage more efficient use of water resources include: designing all aspects of landscaping to reduce water demand and retain runoff; minimizing impervious surfaces so land is available to absorb stormwater; and incorporating water holding areas such as creeks and ponds into the urban landscape.

This UWMP is based on the City's adopted General Plan land uses and policies, and focuses on water demand and supply. Ahwanhee Principles specifically discussed in the UWMP include: recycled water, implementing urban water conservation technologies, and exploring locally available drought-proof water supplies, such as desalination of non-potable water.

1.4 Public Participation

The City conducted an extensive public involvement effort for this UWMP update. Public participation included coordination with the Community Sustainability Commission (CSC), a public hearing to receive public comments on the Final Draft UWMP report, and coordination with other agencies regarding the UWMP. These public involvement activities are described below.

1.4.1 Community Sustainability Commission

Members of the City's CSC provided input on drafts of the UWMP. In particular, the CSC's Work Group 4 met with City staff and consultants for a kickoff meeting in 2010 and reviewed the Administrative Draft UWMP in February 2011.

The Draft UWMP was made available to the CSC, and to the public, in advance of the CSC's March 21, 2011, meeting. At that meeting, City staff and consultants reviewed the contents of the UWMP. The CSC and members of the public were asked to provide input on the UWMP, particularly on proposed measures that the City may implement to help achieve water conservation goals.

The Final Draft UWMP was made available to the CSC and to the general public in advance of the CSC's May 16, 2011 meeting. City staff and consultants presented an update on the UWMP efforts and comments from the CSC.

The general public was invited to participate in all the CSC meetings by means of newspaper notices and articles, information posted on the City's website, and invitations to the news media to cover the meetings.

1.4.2 Agency Coordination

The City participates in regional water management planning efforts through SCWA. SCWA members include the Cities of Benicia, Dixon, Fairfield, Rio Vista, Suisun City, Vacaville, and Vallejo; the Solano Irrigation and Maine Prairie Water Districts; and Reclamation District 2068. Table 1-1 lists the agencies that have coordinated to support the development of this UWMP.

Table 1-1. Agency and Public Coordination Efforts

Coordinating Agencies	Participated in Developing the Plan	Commented on the Draft Plan	Attended Public Meetings	Contacted for Assistance	Received Copy of the Final Draft Plan	Commented on the Final Draft Plan
City of Dixon					X	
City of Fairfield	X				X	
City of Rio Vista					X	
City of Suisun City					X	
City of Vacaville					X	
City of Vallejo					X	

Table 1-1. Agency and Public Coordination Efforts

Coordinating Agencies	Participated in Developing the Plan	Commented on the Draft Plan	Attended Public Meetings	Contacted for Assistance	Received Copy of the Final Draft Plan	Commented on the Final Draft Plan
Solano Irrigation District					X	
Marine Prairie Water District					X	
Reclamation District 2068					X	
SCWA				X	X	
Workgroup 4 of the Benicia Community Sustainability Commission	X	X	X			
Benicia Community Sustainability Commission	X	X	X		X	
General Public		X	X			

These agencies were notified in March 2011that the City is updating its UWMP. Copies of these notices are included in Appendix B-1. The agencies also received a copy of this Final Draft UWMP.

1.4.3 Public Hearing

Copies of the Final Draft UWMP were made available for public review at the City's public library and at City Hall, and the plan was posted on the City's website. Notices announcing the public hearing were posted on the City's website and published four times in the Benicia Herald.

The public hearing was held on May 17, 2011, at City Hall to receive comments from the public on the Final Draft UWMP. Appendix B-2 contains a copy of the public notice. The public hearing agenda and minutes are included in Appendices B-3 and B-4, respectively.

1.5 Plan Adoption

The City Council adopted the final UWMP at its scheduled Council meeting on June 21, 2011. The City Council resolution of UWMP adoption is included as Appendix C.

Within 30 days of adoption, the City will submit the Final UWMP to DWR and the California State Library. To facilitate DWR's review, Appendix D contains the Urban Water Management Plan Checklist, which lists the location of each required element of the UWMP.

Within 30 days of adoption, the City will make the Final UWMP available to the public.

Section 2
System Description

2.1 Law

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 facts 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.

2.2 City Background

2.2.1 History and Government

As shown on Figure 2-1, Benicia is a waterfront city located on the northern side of Carquinez Strait that connects San Pablo Bay and the Sacramento-San Joaquin Bay-Delta Estuary system. The City is bordered on the west by the neighboring City of Vallejo. The City of Martinez is located across the Carquinez Strait to the south. The areas to the north and east of the City are unincorporated Solano County lands.

Benicia is a historic city and retains many of its historic buildings. It was founded in 1847, and was one of the first two cities to incorporate in the State in 1850. The downtown area is located along the waterfront, and residential development is to the north against the coastal hills. Industrial uses are primarily along major highways.

Benicia is a full-service city with an elected member Council and full-time City Manager. The City's water and wastewater services are operated and managed through its Public Works & Community Development Department. The first waterworks system for the City, the Benicia Water Company, was built in 1880 by a group of citizens who acquired water rights on Paddy Creek and Sulphur Springs Creek north of the City, constructed a pipeline into town, and installed some wells to supplement the creek water.

2.2.2 Watershed Characteristics

The City's planning area drains to Suisun Bay and the Carquinez Strait. Figure 2-2 shows the major drainage watersheds within the City planning area as identified in the City's General Plan. These watersheds are areas that drain surface runoff to creeks and water bodies in and adjacent to the City.

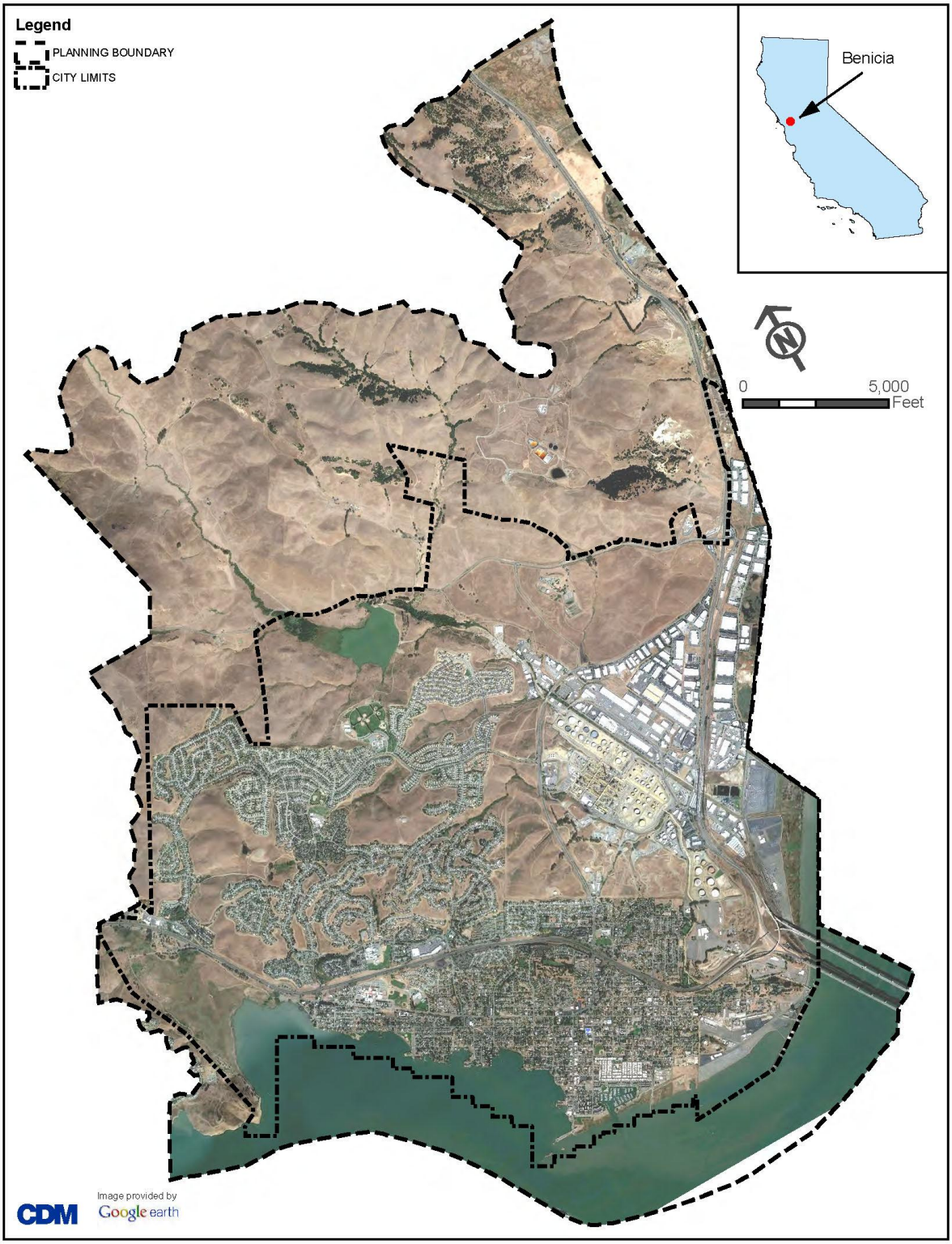

Figure 2-1
Location Map

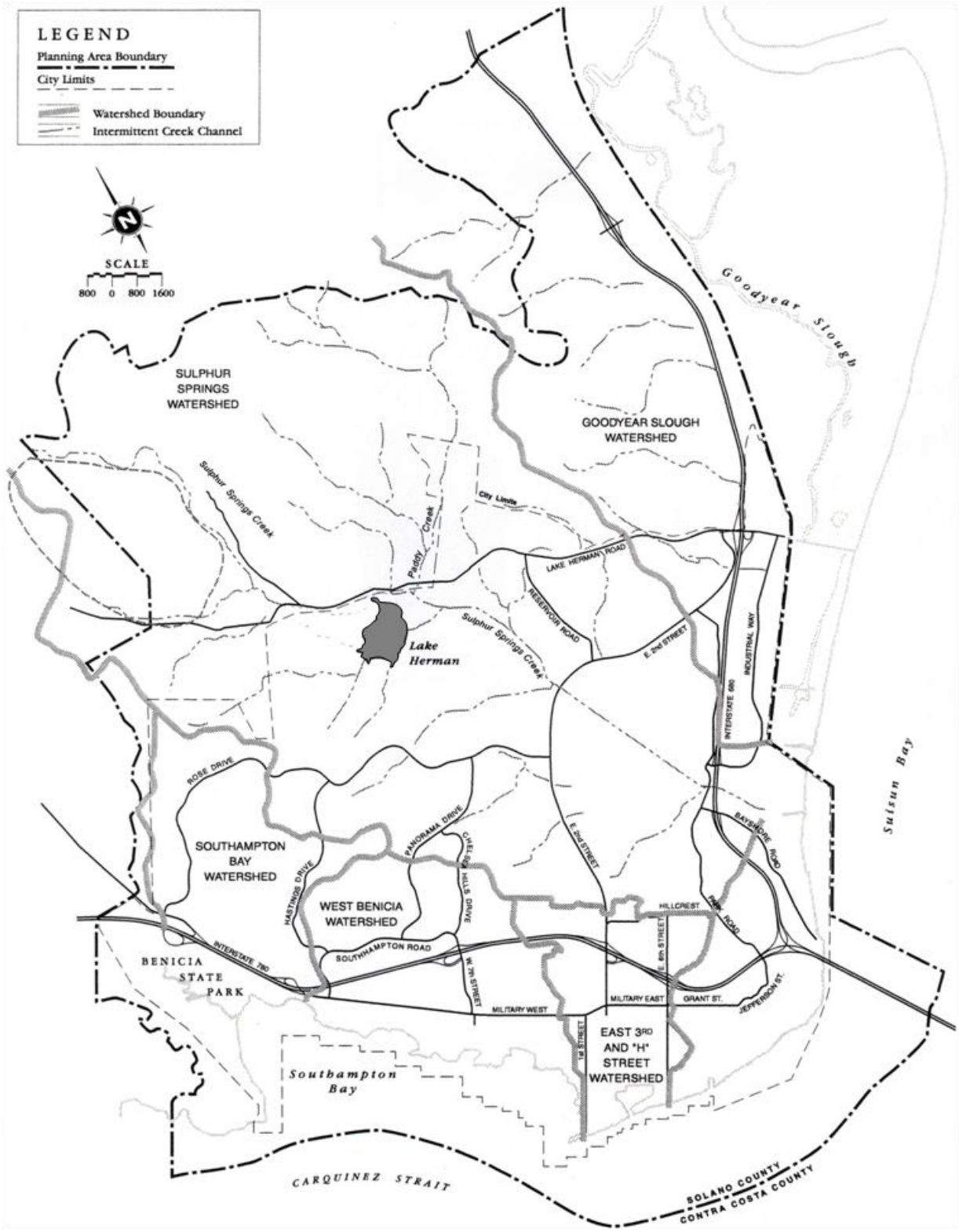

Figure 2-2
Drainage Areas

Sulphur Springs Creek and its main tributary, Paddy Creek, form the largest watershed that drains the central part of the planning area and includes Lake Herman. The Sulphur Springs Creek watershed is approximately 18 square miles, with the upper 6 square miles located outside the City's planning area within the City of Vallejo sphere of influence. The Paddy Creek tributary drains a 3 square mile area at the lower reach of Sulphur Springs Creek just below the Lake Herman outlet. Lake Herman serves as part of the City's water supply system.

The southernmost part of the City drains southerly into the Carquinez Strait via local drainages. The northeastern part of the planning area drains easterly to Goodyear Slough and then to Suisun Bay. These other smaller watersheds, while not part of the City's water supply system, are included in its overall water resource management efforts.

2.3 Climate Characteristics

Benicia has an inland coastal maritime climate typified by cool, wet winters with significant periods of fog and warm, dry summers with frequent cooling sea breezes from the west. Water demand in the City service area increases in the summer months due to outdoor irrigation. Total precipitation in Benicia averages about 20 inches per year and falls mostly between December and April. Typically, July and August are the hottest months of the year with an average high temperature of 87 degrees Fahrenheit. December and January are the coolest months with an average low temperature of 39 degrees Fahrenheit, as shown in Table 2-1. Evapotranspiration (ET) follows a similar trend as temperature, peaking in July and decreasing in January.

Table 2-1. Climate Data

Month	Monthly Average Maximum Temp.[1] (°F)	Monthly Average Minimum Temp.[1] (°F)	Monthly Average Precipitation[1] (in)	Monthly Average Evapotranspiration[2] (in)
January	54	39	4.25	1.3
February	60	42	3.81	1.4
March	64	44	3.24	2.7
April	71	46	1.04	3.8
May	78	50	0.46	4.9
June	84	54	0.12	5.0
July	87	55	0.02	6.4
August	87	55	0.08	5.5
September	83	54	0.24	4.4
October	75	49	0.94	2.9
November	63	43	2.59	1.2
December	55	39	2.79	0.7
Annual	72	48	19.58	40.3

[1] Source: Average Weather for Benicia, CA. www.weather.com.
[2] Source: California Code of Regulations, Title 23, Chapter 2.7, Model Water Efficient Landscape Ordinance.

2.4 Demographic Characteristics

Population and housing projections are tools utilized to project municipal and industrial water demands. Table 2-2 provides population projections for the City from 2010 to 2035. These projections were provided by the City's Planning Division and were developed in coordination with the Association of Bay Area Governments (ABAG). The City is very close to build-out. Growth will occur slowly from the 2010 population of 28,086 to reach a population of 30,100 in 2035, an increase of about 2,000 people. Housing units will increase from 10,552 units in 2010 to reach 11,680 units at build-out in 2035.

Table 2-2. Population and Housing Unit Forecast from 2010-2035

Year	Population[1]			Housing Units[1]		
	Population	Percent	Change	Housing Units	Percent	Change
2010	28,086	NA	NA	10,552	NA	NA
2015	28,504	1.5%	418	10,805	2.4%	253
2020	28,929	1.5%	425	11,065	2.4%	259
2025	29,360	1.5%	431	11,330	2.4%	266
2030	29,800	1.5%	440	11,600	2.4%	270
2035	30,100	1.0%	300	11,680	0.7%	80

NA: Not applicable

[1] Data provided by City's Planning Division. Source: Association of Bay Area Governments, Projections and Priorities 2009.

Section 3
Water Demands

This section details current and future water demands for the City service area. The total demand for the service area includes both potable and non-potable water demands. These demands include various water use sectors including: single-family residential; multi-family residential; commercial/institutional; industrial; and landscape irrigation. The City does not use any water for saline water intrusion barriers, groundwater recharge, or conjunctive use. Water use projections for the service area are provided in 5-year increments to year 2035.

3.1 Law

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

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; and (I) Agricultural.

10631 (e) (2) The water use projections shall be in the same 5-year increments to 20 years or as far as data is available.

New Requirements for 2010 UWMPs

10608.20 (e) An urban retail water supplier shall include in its urban water management plan due in 2010 the baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the basis for determining those estimates, including references to supporting data.

10631.1 (a) The water use projections required by Section 10631 shall include projected water use for single-family and multifamily residential housing needed for lower income households, as defined in Section 50079.5 of the Health and Safety Code, as identified in the housing element of any city, county, or city and county in the service area of the supplier.

3.2 Service Area Demands

Water demand is the amount of water used by the City's customers and in the City's water system, which the City will need to supply. The two components of the City's water demand discussed in this section are:

- Treated water use by customers; and
- Untreated water for Valero industrial use, and operations and emergency water.

The City has no interconnections with other cities or districts and no wholesale demands.

3.2.1 Treated Water Demands

Treated water demands represent water processed by Benicia's water treatment plant (WTP) and sold to customers within the service area. Section 4, Water Supply Sources, provides further discussion of the WTP. Meters are classified by the following water use sectors:

- Single-family residential: dwellings for individual families, including detached and attached housing.
- Multi family residential: apartment complexes and condos.
- Commercial/Institutional: includes businesses, educational facilities, and government facilities. Industrial customers were consolidated with Commercial/Institutional customers until 1998.
- Industrial: includes manufacturing facilities, assembly facilities, and industrial parks. This customer category does not include untreated water provided to Valero. Industrial customers were consolidated with Commercial/Institutional customers until 1998.
- Irrigation: includes meters that are specifically designated for irrigation use.
- Other: includes meters that are not classified into the preceding categories, such as meters only in use during construction.

Table 3-1 presents the historical and current number of meters and treated water deliveries for the City for various water use sectors. Volumes of water are presented in acre-feet per year (AFY). Water use and water supply information is often provided in units of acre-feet per year. One acre-foot of water is the volume of water that will cover one acre of land at a depth of one foot. One acre-foot of water is approximately 326,000 gallons of water.

Table 3-1. Treated Water Meters and Consumption for 2005 and 2010

Water Use Sectors	2005		2010	
	# of Meters	Volume (AFY)	# of Meters	Volume (AFY)
Single family	8,275	3,004	8,618	2,701
Multi-family	270	524	307	467
Commercial/Institutional [1]	683	1085	529	381
Industrial[2]	91	146	76	89
Irrigation[3]	58	140	282	536
Other	14	102	10	9
Total Meters	9,391		9,822	
Total Consumption		5,000		4,183

Source: Data acquired from Benicia WTP flow summary spreadsheets and City records.

[1] In 2005, Institutional/municipal water uses comprised about 14% of the total use for the combined commercial and institutional category, and institutional/municipal accounts comprised about 7% of the total number of accounts in the combined category. In 2010, institutional/municipal water uses comprised about 15% of the total water use for the combined commercial and institutional category. Institutional/municipal accounts comprised about 11% of the total number of accounts in the combined commercial and institutional category

[2] Industrial use is treated water only. Untreated (raw) water supplied to Valero is not included in this table; it is discussed in Section 3.2.2.

[3] With the implementation of the City's new billing system in 2007, irrigation use has been correctly captured in the "Irrigation" category rather than in the "Commercial/Institutional" and "Industrial" categories.

Projections of treated water demand in the City's service area were developed for 2015, 2020, 2025, 2030, and 2035 for each water use sector and are presented in Table 3-2. Over the period from 2010 to 2035, the City estimates an increase in treated water consumption from 4,183 AFY to 4,505 AFY and an increase in the number of service accounts from 9,822 to 10,580 by assuming growth equivalent to population projections for the same period.

Table 3-2. Projected Treated Water Meters and Consumption for 2015 - 2035

Water Use Sectors	2015		2020		2025		2030		2035	
	# of Meters	Volume (AFY)	# of Meters	Volume (AFY)	# of Meters	Volume (AFY)	# of Meters	Volume (AFY)	# of Meters	Volume (AFY)
Single family	8,751	2,743	8,888	2,786	9,030	2,830	9,176	2,876	9,282	2,909
Multi-family	312	474	317	482	322	489	327	497	331	503
Commercial/ Institutional	537	387	546	393	554	399	563	406	570	410
Industrial	77	90	78	92	80	93	81	95	82	96
Irrigation	286	544	291	553	296	562	300	571	304	577
Other	10	9	10	9	10	9	11	10	11	10
Total Meters	9,973		10,130		10,292		10,458		10,580	
Total Consumption		4,248		4,314		4,383		4,454		4,505

3.2.2 Untreated Water Demands

In addition to treated water use by customers, there are untreated water demands that must be provided by the City's water supplies. These components are summarized below in Table 3-3.

Table 3-3. Historical and Projected Untreated Water Deliveries for 2010-2035

Water Use Sectors	Untreated Water Demand (AFY)						
	2005	2010	2015	2020	2025	2030	2035
Operations and Emergency Water	970	441	441	441	441	441	441
Raw Water for Valero	4,850	4,792	5,296	5,800	5,800	5,800	5,800
Total Untreated Water Demand	5,820	5,233	5,737	6,241	6,241	6,241	6,241

Source: Data acquired from Benicia WTP flow summary spreadsheets and City records.

- ***Operations and Emergency Water (untreated water).*** This component includes water used at the WTP for treatment processes. It also includes surplus water supply that bypasses the plant and is stored in Lake Herman for emergencies. Water supply is pumped to the treatment plant at a constant rate. During periods of low demand, water supplied at a higher rate than needed to serve consumptive uses in the distribution system is stored in Lake Herman. The lake serves as an emergency backup supply for the treatment plant. The amount of operations and emergency water used varies from year to year. In the past five years, it has ranged from a low of 239 AF in 2009 to a high of 1,684 AF in 2006. For the purposes of the UWMP, operations and emergency water is projected to remain the current level of 441 AFY through 2035.

- ***Raw (untreated) Water for Valero.*** The Valero refinery contracts with the City for raw (untreated) water supply for industrial uses, such as cooling water. Raw water deliveries to Valero from 2001-2010 have ranged from 4,528 AFY to 5,350 AFY depending on the number of refining processes in operation. Average deliveries provided to Valero in that time have been approximately 4,780 AFY. For conservative demand planning, future Valero water use is estimated to increase linearly from its 2010 usage to the maximum demand quantity of 5,800 AFY in 2020, and remain at that level through 2035.

3.2.3 Total Water Demand

While treated and untreated water demands are associated with different customers, the City must use the combination of these demands to evaluate whether there is sufficient supply available to meet total water demand. The remaining component of total water demand is unaccounted-for water.

Unaccounted-for water is the difference between total water supply production and billed consumption. All water systems have some level of unaccounted-for water, typically ranging from 10-20 percent of total demand. Sources of unaccounted-for water in the City's system may include losses from system leaks, meter inaccuracies, unmetered uses of water such as emergency uses of fire hydrants, or other unauthorized uses. Unaccounted-for water as a percentage of total water production has averaged 15.1 percent over the past 5 years, and has averaged 14.2 percent over the past 9 years. During that time, unaccounted-for water has fluctuated from a low of 11.4 percent in 2006 to a high of 19.6 percent in 2007. Unaccounted-for water use was probably not accurate between 2006 through 2008, a low period for this sector, because the treated water meter at the WTP was not working properly. The meter was replaced in January 2009, which resulted in an increase in measured unaccounted-for water in 2009. Unaccounted-for

water in 2010 was measured as 13.3 percent. The UWMP assumes unaccounted-for water will average 10 percent of total water demand in future planning years.

Historical and projected total water demands are shown in Table 3-4. These values are used to evaluate supply reliability in normal, single-dry, and multiple-dry year scenarios in Section 5.4.

Table 3-4. Historical and Projected Total Water Demand for 2010 - 2035 (AFY)

Water Demand Type	2005	2010	2015	2020	2025	2030	2035
Treated Water Demand	5,000	4,183	4,248	4,314	4,383	4,454	4,505
Untreated Water Demand	5,820	5,233	5,737	6,241	6,241	6,241	6,241
Unaccounted-for Water	1,617	1,447	1,109	1,173	1,180	1,188	1,194
Total Water Demand	12,437	10,863	11,094	11,728	11,804	11,883	11,940

3.3 Low-Income Water Demand

New requirements for 2010 UWMPs include reporting the projected low-income customer water demand. Low income households are classified as households that have an annual income 80 percent of the area median household income adjusted by the number of persons in the household (California Health and Safety Code Section 50079.5).

The City has provided affordable housing units (AHUs) for low-income residents. Based on locations provided by the City's Planning Division, the City determined the five-year average water use for the 139 single-family AHUs and the 138 multi-family AHUs. This data is presented in Table 3-5, along with projections for single-family and multi-family AHU water use through 2035. This low-income water use is accounted for in the City's overall demand projections. There are currently no new AHU development projects planned in the City, and no additional units have been assigned to the City by the regional housing authority.

Table 3-5. Current and Projected Water Demands for Low-Income Customers

Type	Water Demand (AFY)					
	2006-2010 Average	2015	2020	2025	2030	2035
Single-family residential[(1)]	28	28	28	28	28	28
Multi-family residential[(2)]	23	23	23	23	23	23
Total low-income demand	51	51	51	51	51	51

Source: Data based upon number of AHUs in the City (provided by Planning Division) and five-year average use for those units (provided by the Public Works).
[(1)] The City has 139 single-family AHUs for low-income residents
[(2)] The City has 138 multi-family AHUs for low-income residents

Aside from these AHUs, there are 372 Section 8 voucher "low income" rentals within the City. Per the City's Senior Planner, Section 8 housing is not designated as "affordable". Section 8 vouchers are for rental properties at market rate rent and 372 families receive vouchers to help with the payment. These units

frequently change hands. These units were not included in the estimate of low-income water use in the City because it is more difficult to determine a steady water use across the units.

3.4 Water Conservation Bill Requirements

The Water Conservation Bill (Senate Bill 7) was developed to implement the 20x2020 Plan, which sets forth a state-wide road map to maximize the state's urban water efficiency and conservation opportunities between 2009 and 2020, and beyond. It aims to set in motion a range of activities designed to achieve a 20 percent reduction in gross per capita urban water demand by 2020. Section 1060.12 (g) defines gross water use as the total volume of water, whether treated or untreated, entering the distribution system of an urban retail water supplier, excluding all of the following:

- Recycled water that is delivered within the service area of an urban retail water supplier or its urban wholesale water supplier;
- The net volume of water that the urban retail water supplier places into long-term storage;
- The volume of water the urban retail water supplier conveys for use by another urban water supplier;
- The volume of water delivered for agricultural use, except as otherwise provided in subdivision (f) of Section 10608.24; and
- Industrial process water, which may be excluded from the calculation of gross water use to avoid a disproportionate burden on another customer sector if it comprises a *substantial percentage* of industrial water use in its service area.

DWR has published guidelines describing how to determine the baseline gross per capita water demand for water purveyors throughout California. The guidelines allow for use of one of four alternatives to calculate the reduction in baseline per capita demand between baseline levels and 2020 needed to demonstrate compliance. Section 3.4.1 presents the computation of baseline per capita demand values for the City, and Section 3.4.2 presents interim and final targets. In addition, Section 3.4.3 estimates the effectiveness of water conservation best management practices (BMPs) implemented in recent years and the remaining demand reduction needed for the City to reach the interim and final targets for per capita demand by 2015 and 2020, respectively.

3.4.1 Baseline Gross Per Capita Demand

The gross per capita water demand for Benicia was calculated using the total water demand less the untreated water demands of the raw water supplied to Valero and the operations and emergency water.

The City determined that Valero's untreated, process water demand qualifies as a "substantial" portion of the total water demand. Since 1999, Valero's portion of the City's total water deliveries has ranged from 42 percent to 49 percent, with an average of 46 percent. Based on this data, untreated water supplied to Valero for use as industrial process water was excluded from the estimate of gross water use. Treated water supplied to Valero for domestic use is accounted for in baseline calculations as treated water for industrial demands.

Untreated operations and emergency water is used to maintain emergency storage levels for Lake Herman. The water travels between their supply source, Lake Herman, and the treatment plant, depending on the volume of demand. The untreated water does not enter the distribution system, and is therefore excluded from the estimate of gross water use.

Actual per capita water demand for the City was determined for each calendar year from 1995 through 2010 as the total treated water demand (including unaccounted-for water) divided by the population. The baseline per capita water demand represents water use over a continuous multi-year base period. To account for year-to-year fluctuations in per capita water use, multi-year averages of annual per capita demand are the basis for the baseline per capita demand. Two base periods are specified for different functions, as follows:

- For the baseline per capita demand, if recycled water made up 10 percent or more of 2008 retail water delivery, use a continuous 10- to 15-year period ending no earlier than December 31, 2004, and no later than December 31, 2010. Otherwise, only a continuous 10-year period can be used to set the baseline per capita demand.
- For the minimum water use reduction requirement, it is necessary to compute per capita demand over a continuous five-year base period ending no earlier than December 31, 2007, and no later than December 31, 2010. The urban water use target is not to exceed 95 percent of the per capita demand over this base period.

The City does not use significant quantities of recycled water; therefore, a continuous 10-year period was used for the baseline period. The averages of per capita demand over the evaluated base periods provided a basis for selecting a baseline per capita demand of 195 gallons per capita per day (gpcd), as shown in Table 3-6. The City selected the maximum value of the base period averages, which occurred for the period of 1995-2004, to represent the baseline per capita demand.

Table 3-6. Computation of Baseline Per Capita Water Demand for the City

Year	Population	Annual Demand (AFY)	Annual Per Capita Demand (gpcd)	10-Year Average Per Capita Demand (gpcd) [1]
1995	25,651	5,665	197	NA
1996	25,894	5,994	207	NA
1997	26,137	6,518	223	NA
1998	26,379	4,916	166	NA
1999	26,622	5,610	188	NA
2000	26,865	5,703	190	NA
2001	27,155	5,848	192	NA
2002	27,188	5,645	185	NA
2003	27,123	5,889	194	NA
2004	27,005	6,271	207	195
2005	27,163	5,883	193	195
2006	27,159	5,372	177	192
2007	27,768	5,496	177	187
2008	27,830	5,233	168	187
2009	27,912	5,777	185	187
2010	28,086	5,500	175	185
Baseline Per Capita Demand (maximum of multi-year average per capita demand)				**195**

Source: Population data acquired from the California Department of Finance. Water use data for amount of water entering the distribution system acquired from Benicia WTP flow summary spreadsheets and City records.

[1] Ten-year averages of per capita demand for setting the City's baseline per capita demand cannot end earlier than 2004 or later than 2010.

Water Code Section 10608.22 specifies a minimum water use reduction requirement, which sets a value for baseline per capita demand that computed targets for compliance in 2020 are not to exceed, unless the five-year base period average is less than 100 gpcd. The minimum water use reduction requirement for the City is computed in Table 3-7. This value would be used as the urban water use target per capita water demand if estimates of the urban water use target per capita water demand using other methods (described in Section 3.4.2) are greater.

Table 3-7. Computation of Minimum Water Use Reduction Target for the City

Year	Population	Annual Demand (AFY)	Annual Per Capita Demand (gpcd)	5-Year Average Per Capita Demand (gpcd) [1]
2003	27,123	5,889	194	n/a
2004	27,005	6,271	207	n/a
2005	27,163	5,883	193	n/a
2006	27,159	5,372	177	n/a
2007	27,768	5,496	177	190
2008	27,830	5,233	168	184
2009	27,912	5,777	185	180
2010	28,086	5,500	175	176
Minimum Water Use Reduction Requirement (0.95 * max five-year average per capita water demand)				**180**

Source: Population data acquired from the California Department of Finance. Water use data acquired from Benicia WTP flow summary spreadsheets and City records.

[1] Five year average of per capita water demand for setting the minimum water use reduction requirement cannot end earlier than 2007 or later than 2010.

3.4.2 Urban Water Use Target

The urban water use target is the per capita demand that would result in compliance with the requirements of the Water Conservation Bill. The City's per capita demand in 2020 must be at or below the urban water use target to demonstrate compliance. In addition, development of an interim urban water use target, equal to halfway between the baseline water use and the 2020 urban water use target, is required.

DWR provides four alternative methods to compute the urban water use target for a water supplier. The first method is to reduce the baseline per capita demand by 20 percent, which is consistent with the state-wide goal of 20 percent reduction in per capita urban water use demand by 2020. The other three methods estimate a less aggressive demand reduction appropriate for agencies that have a high proportion of commercial, industrial, or institutional demand forecasted, or if current water demand indicates high levels of water conservation and/or recycling have already been achieved. Detailed guidance on implementing each method is included in DWR's "Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use." The methods are summarized below:

- **Method 1:** Eighty percent of the water supplier's calculated baseline per capita demand.
- **Method 2:** Per capita daily water use estimated using the sum of performance standards applied to indoor residential use; landscaped area water use; and commercial, industrial, and institutional uses.
- **Method 3:** Ninety-five percent of the state hydrologic region target applicable to the water supplier, as stated in the State's February 2010 20x2020 Water Conservation Plan.

- **Method 4:** Calculates water demand savings through implementation of the following BMPs: retrofits of inefficient indoor residential fixtures, such as toilets, washers, and showers; increased efficiency in the commercial, industrial, and institutional accounts; and conversion of unmetered connections to metered connections. The target represents the water demand if the BMPs are implemented within the service area at saturation levels.

The City selected Method 2 to compute its urban water use target per capita demand. There are three components to calculating the water use target using Method 2:

- **Indoor residential water use:** DWR defines this as 55 gpcd in its guidance documents.
- **Landscaped area water use:** This value must be calculated based upon landscaping surveys. Landscaped areas within the City were estimated through surveying irrigated areas for each parcel, described in more detail below. Target water use for irrigated areas was calculated using the methodology developed in the 2009 Model Water Efficient Landscape Ordinance (MWELO).
- **Commercial, Industrial, and Institutional (CII) Water Use:** Based on DWR methodologies, this value was calculated using 90 percent of the ten-year average of CII per capita water use from 1997-2006.

The following process to measure the City's landscaped areas was used by interns working with the City of Fairfield:

- Google Earth was used to measure the square footage of landscaping in the City. Large landscapes (e.g., schools, parks, and cemeteries) were measured directly. Sites were hand-drawn overlaying the aerial photography with Google Earth's polygon tool. GE-Path, a free-ware application available on the internet, was then used to generate square footage calculations from the data files.
- Residential and other less intensive landscaped areas were calculated by a similar process. Calculations of the exterior edge of subdivided areas within the City were made, and then polygons of streetscape and estimated hardscape were subtracted from the subdivision areas.
- Within the technical methodologies provided by DWR, most aerial photography measurements are performed in a sampling manner, where a sample area is measured in detail and then the landscaping ratios are applied across the population of all square footage in the community. Because of the size of Benicia, the entire city was measured in detail.
- Method 2 requires that the landscaped area of the community be examined in 2015 and 2020 to reflect the current status of landscaped area at these interim target and final target dates. Although the 2010 measurements are critically important in the decision making process of selecting a methodology to establish a water use target, the 2010 measurements do not establish baselines, but are simply intended to give a benchmark of water use efficiency at this window of time.

Table 3-8 presents the water use values for each component of Method 2. Using Method 2, the total estimated water use is 195 gpcd. As described in Section 3.4.1, this value must be compared to the calculation of the City's minimum required water use reduction, which is shown in Table 3-7 as 180 gpcd. Since the minimum required water use reduction is less than the water use calculated using Method 2, the City's 2020 target water use must be equal to the minimum reduction of 180 gpcd. The interim 2015 water use target is 188 gpcd, which is halfway between the City's baseline water use of 195 gpcd and the 2020 target water use of 180 gpcd.

Table 3-8. Method 2 Computation of 20x2020 Target for the City

Demand Category	gpcd
Indoor Residential Water Use	55
Landscaped Area Water Use	107
CII Baseline Water Use	33
Total Estimated Water Use	195
Minimum Water Use Reduction Calculation (see Table 3-7)	180
Required 2020 Target (minimum of Total Estimated Water Use using Method 2 or Minimum Water Use Reduction)	**180**
Percent baseline reduction	**7.6%**
Base Daily Per Capita Water Use (see Table 3-6)	195
Interim 2015 Target	188

3.4.3 Method for Demonstrating Compliance with the Water Conservation Bill Requirements

The City will demonstrate compliance if the per capita demand during the final year of the 2010-2015 and 2016-2020 UWMP reporting periods is less than or equal to the interim and final urban water use targets, respectively. Compliance assessments will be reported in the City's 2015 and 2020 UWMPs. If the 2015 UWMP shows that the interim water use target is not achieved, adjustments will be made to its water conservation plan to achieve the 2020 urban water use target.

The City calculated per capita demand over the 1995 – 2004 baseline period to compare with the interim and final targets. Figure 3-1 presents the City's historical per capita water demand in **blue**, the baseline per capita water demand in **green**, the 2015 interim water use target in **orange**, and the 2020 water use target in **red**. As shown in Figure 3-1, urban per capita water use in 2010 is 175 gpcd, which equates to a 10 percent reduction from the baseline per capita demand.

The City is currently under both the 2015 interim target and the 2020 target. Several factors exist that can affect water consumption, such as water conservation measures, drought conditions, climatic conditions (e.g., cool summers), and the economy, making it very difficult to determine whether water use reduction is a direct result of one or more water conservation measures.

Figure 3-2 presents annual evapotranspiration data for the City from 1995 through 2010. ET is the loss of water to the atmosphere by the combined processes of evaporation from soil and plant surfaces and transpiration from plant tissues. It is an indicator of how much water crops, lawn, garden, and trees need for healthy growth and productivity, and ET has an impact on water use. Estimates of ET take into account both temperature and precipitation, along with many other climate and soil characteristics.

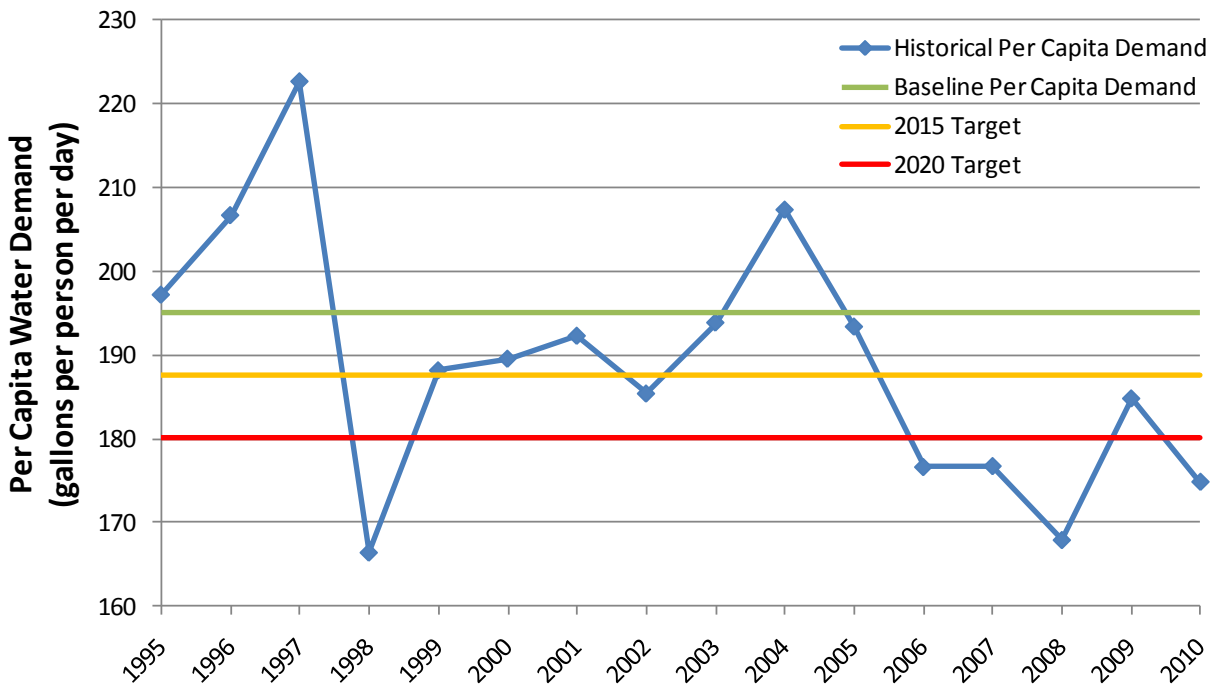

Figure 3-1
Historical Water Use vs. Future Targets

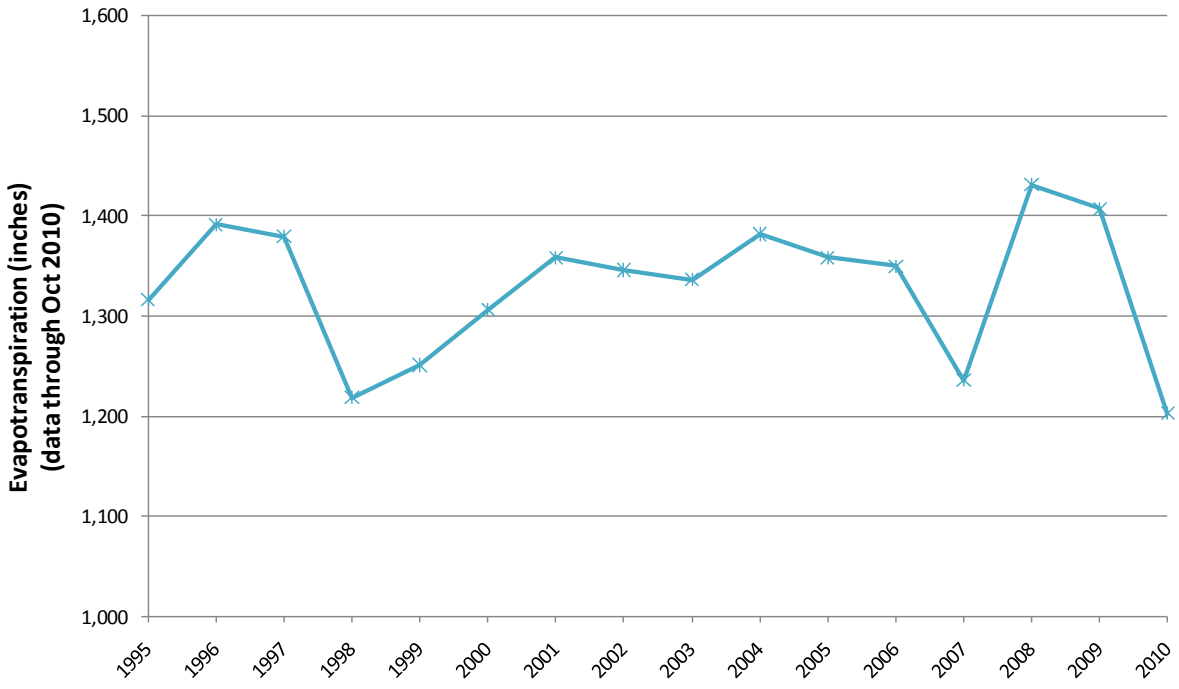

Figure 3-2
Evapotranspiration Data 1995-2010

The demand reduction currently necessary to reduce the per capita demand to the interim and final urban water use targets is shown in Table 3-9. To ensure compliance with the 2015 and 2020 targets, the City needs to maintain its per capita water demand below the target levels through 2020. The City could implement the following activities in the future, as needed, to mitigate any potential increase in demand due to economic recovery or a change in hydrologic conditions:

- Ensuring correct application of more stringent design standards related to indoor and outdoor water use for new development projects (e.g., State-wide MWELO). The City will work in concert with the CSC to address water-wise landscaping through strategies in the City's Climate Action Plan (CAP);
- Enforcement of prohibited water uses during Stage 1 per the Emergency Water Conservation Ordinance (see Section 5.6.3);
- Enhancement of demand management measure (DMM) implementation (see Section 6); and/or
- Implementation of additional water conservation measures per the City's CAP (see Section 3.5).

Table 3-9. Computation of Demand Reduction Needed to Comply with the Water Conservation Bill

Planning Year	Water Demand (AFY)	Projected Population	Projected Per Capita Demand (gpcd)	Target Per Capita Demand (gpcd)	Demand Reduction Needed to Reduce Projected Per Capita Demand to Target Levels	
					AFY	% of Total Demand
2015	5,257	28,515	165	188	0	0%
2020	5,381	28,943	166	180	0	0%
2025	5,457	29,372	166	180	0	0%
2030	5,535	29,800	166	180	0	0%
2035	5,592	30,100	166	180	0	0%

Source: Water demand based on projection of water entering the distribution system, per DWR's guidance. See Table 2-2 for population projections. See Table 3-8 for calculation of per capita demand targets.

3.5 Potential Additional Conservation Measures

In 2007, Benicia's City Council adopted a resolution to act on climate change and officially join ICLEI - Local Governments for Sustainability's Cities for Climate Protection Campaign. The City's CAP sets forth a series of actions the City can take to reduce its contribution to global climate change by lowering its greenhouse gas emissions. Three objectives were developed in the CAP for the City's water and wastewater system: Reduce the Amount of Water Consumed 20% by 2020; Reduce the Amount of Emissions Resulting from Pumps and Lift Stations; and Reduce the Amount of Emissions Resulting from Water and Wastewater Plant Operations 95% by 2020.

At the March 2011 CSC meeting, City staff solicited feedback from the CSC, and the public, in prioritizing these strategies. The water use reduction strategies could be implemented by the City, based on need and the recommendation and/or approval by the CSC and the City Council.

These objectives, in order of priority based on CSC and public feedback, are summarized below.

- ***CAP Strategy WW-1.6, Incentivize Water Conservation -*** The existing tiered billing structure could be modified to include more significant incentives for water conservation. Incentives could include tiered rebates and/or a restructuring of the existing billing structure. However, this must be approached extremely carefully to account for the financial realities of water conveyance. The City has certain fixed costs for water supply operation and treatment, regardless of water use levels.
- ***CAP Strategy WW-1.1, Cash for Grass Rebate Program*** to help property owners convert water-thirsty grass to a water efficient landscape. The City would offer property owners a dollar amount per square foot of grass removed and replaced with water efficient landscaping. Every square foot of grass replaced with water-smart trees, shrubs, and flowers can save an average of 30 gallons of water per year. SCWA started a pilot turf replacement rebate program in 2010, offering $0.50 per square foot up to a maximum rebate of $1,000. The program was successful and will be continued in 2011. This program required pre- and post-rebate inspections.
- ***CAP Strategy WW-1.7, Develop a Business Outreach Program*** - Create a business outreach program on water conservation to provide reduction strategies to businesses within the community. This program is defined in more detail in the Climate Action Plan's Industrial and Commercial section.
- ***CAP Strategy WW-1.2, Permitting for Graywater Reuse Systems*** to establish appropriate graywater system permitting exemptions for residential applications pursuant to regulations set by the California Building Standards Commission. California Senate Bill 1258 authorizes a city, county, or other local agency to adopt building standards that prohibit the use of graywater, or that are more restrictive than State requirements, thus allowing residential graywater systems except where an agency specifically does not allow it. The new residential graywater standard divides graywater installations into three types of systems, two of which usually require treatment:
    - Clothes washer system (commonly referred to as laundry-to-landscape systems) or single fixture system, which usually does not need to be treated and can be installed without a permit when certain conditions are followed.
    - Simple system, reusing up to 250 gallons per day and requiring a permit.
    - Complex system, reusing over 250 gallons per day and requiring a permit.
- ***CAP Strategy WW-1.3, Implement Residential Rainwater Collection -*** Create a policy to support permitting and regulation of residential rainwater systems. Develop a program to distribute rainwater barrels to homeowners to capture water runoff from homes for irrigation uses.
- ***CAP Strategy WW-1.4, Require Commercial Rainwater Collection -*** Create a policy that requires collection, storage, and use of rainwater from commercial roof surfaces for on-site landscape irrigation uses and establish a financial incentive program to assist property owners. Concurrently, distribute information regarding rainwater collection systems to commercial property owners and assist them in securing financial support for implementation.
- ***CAP Strategy WW-1.5, Incentives for Residential Plumbing Fixture Upgrades -*** Plumbing retrofits, low-flow showerheads, aerators, and toilet displacement fixtures are responsible for significant water savings. The City should increase the funding and scope associated with existing incentive programs to increase water efficiency and conservation. In January 2011, the CSC approved funding to provide free low-flow showerheads and soil moisture detectors (see Section 6.4.2 for more information).

Additional measures suggested by the public included implementing advanced metering infrastructure to allow for real-time water use measurement and collection of stormwater runoff.

Section 4
Water Supply Sources

This section details current and future water supplies for the City's service area.

4.1 Law

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

10631 (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 as 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:

10631(b) (1) A copy of any groundwater management plan adopted by the urban water supplier, including any specific authorization for groundwater management.

10631(b) (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 over drafted or has projected that the basin will become over drafted 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.

10631(b) (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.

10631(b) (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.

10631 (d) Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.

10631 (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.

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.

10631 (k) Provide documentation that either the retail agency provided the wholesale agency with water use projections for at least 20 years, if the UWMP agency is a retail agency, OR, if a wholesale agency, it provided its urban retail customers with future planned and existing water source available to it from the wholesale agency during the required water-year types

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:

10633 (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.

10633 (b) A description of the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.

10633 (c) 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.

10633 (d) 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.

10633 (e) 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.

10633 (f) 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.

10633 (g) 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.

4.2 Introduction

The City's water supply comes primarily from two surface water bodies. Lake Berryessa water transported through the Putah South Canal provides approximately 20 percent of the City's total consumption. Sacramento River water conveyed through the North Bay Aqueduct (NBA) provides the remaining needs of the City. Lake Herman is used as an emergency source of surface water only. Figure 4-1 illustrates these major sources of surface water supply for the City.

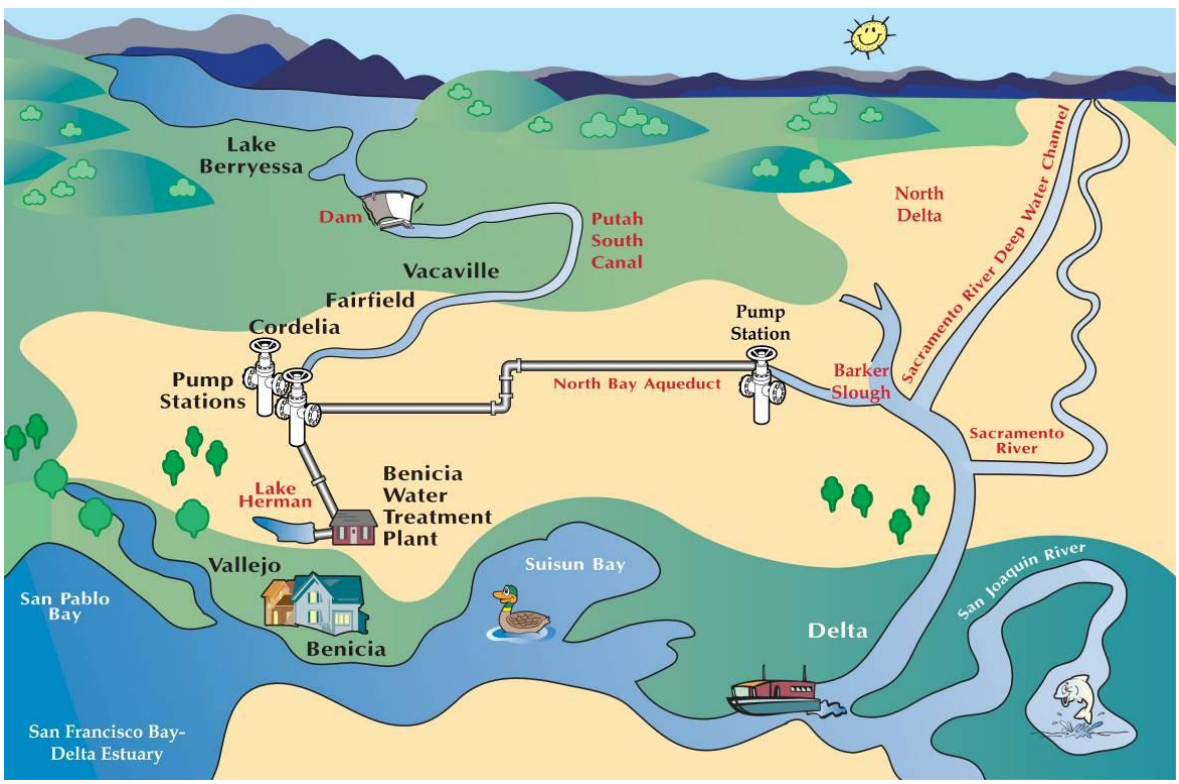

Figure 4-1
City of Benicia Water Sources

4.3 Major City Water Facilities

Figure 4-2 shows the major components of the City's water supply system and treatment facilities. Untreated (raw) water from the City's supply sources is conveyed to the City's WTP. After treatment, treated water is conveyed to customers via the City's water distribution system.

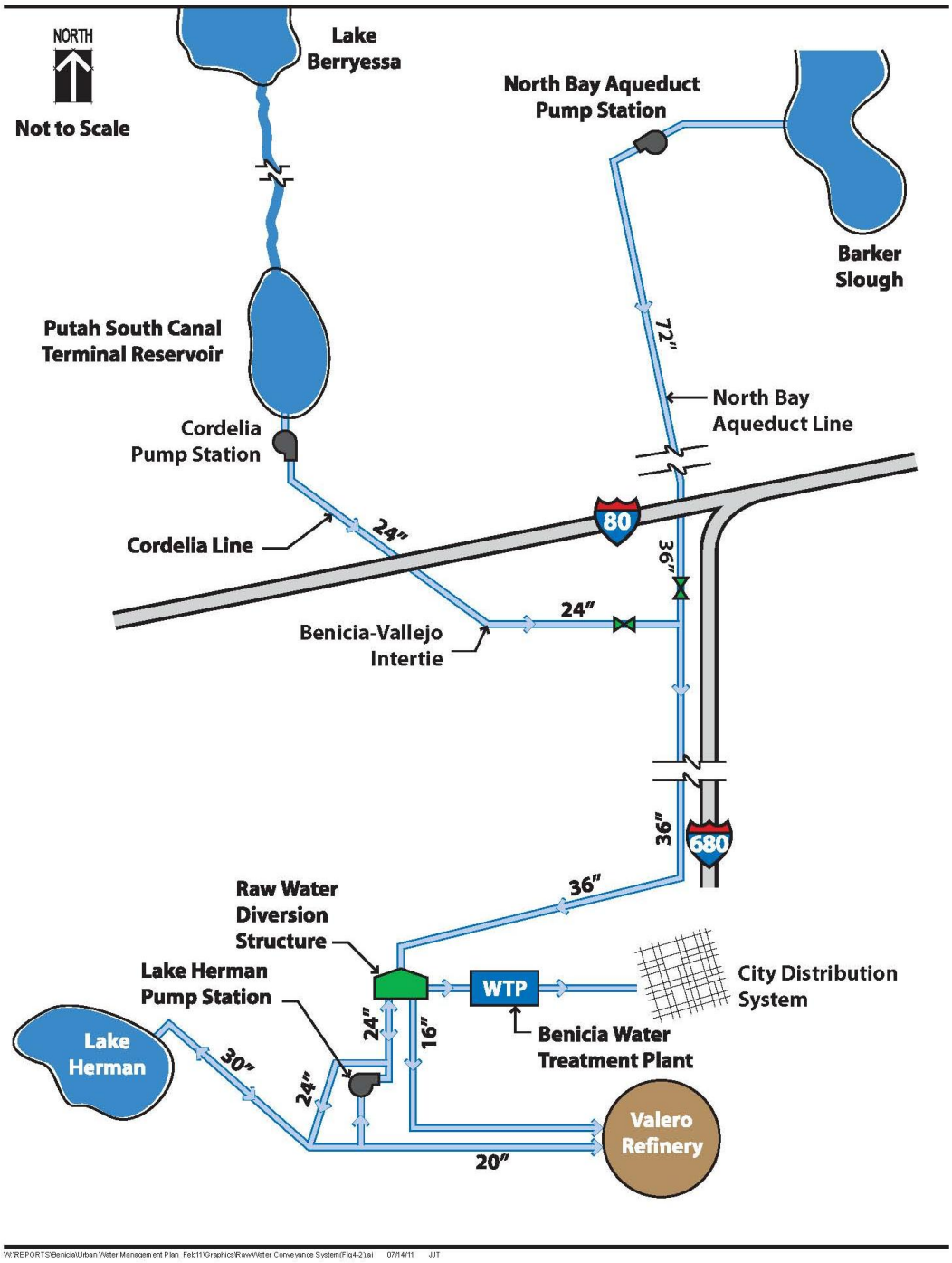

Figure 4-2
Water Conveyance System

4.3.1 Raw (Untreated) Water Conveyance

The NBA extends for 27.6 miles from Barker Slough in the Delta to the end of the Napa Pipeline, providing water supplies to Napa and Solano Counties. The Barker Slough Pump Station in the Delta was designed to deliver a total of 113 million gallons per day (mgd), but pump tests have shown it can only deliver about 92 mgd due to biofilm growth. Benicia's turnout on the NBA is at the Cordelia Forebay and Pumping Plant, about 21.3 miles from Barker Slough. Benicia's contracted allotment is 24.7 mgd, but currently it can only receive about 22.5 mgd due to biofilm growth. The NBA's pipe diameter ranges from 72 inches at Barker Slough to 36 inches at Cordelia Forebay. These facilities are operated by DWR as part of the State Water Project.

The City has the ability to obtain Lake Berryessa water from the Putah South Canal Terminal Reservoir through agreements with the City of Vallejo and Solano Irrigation District (SID). This is typically done when raw water from the NBA is unavailable or of poor quality due to high turbidity and organic content. During these periods, the City operates the Cordelia Pump Station to take water from the Canal and deliver it to the City's treatment facility through a 24-inch diameter pipeline that connects to the NBA. The Cordelia Pump Station has a total capacity of 18.4 mgd and is operated manually by City staff during these periods.

4.3.2 Raw Water Reservoir (Lake Herman)

Pumped raw water from the NBA or Putah South Canal is delivered to the City's treatment facility at a diversion structure. Since the pump stations operate at a fixed speed, surplus flow not needed at the plant is diverted by gravity to Lake Herman through a 24-inch diameter pipeline.

The City has the ability to pump water from Lake Herman back to the treatment facility through the Lake Herman Pump Station. This is typically done during emergencies when supply from the NBA or Putah South Canal is not available. The pump station has a total pumping capacity of 9.6 mgd.

Raw water is also diverted at the diversion structure to Valero through a 16-inch diameter pipeline. It is also possible to provide raw water to Valero directly from Lake Herman. Flows to Valero are metered.

4.3.3 Water Treatment Plant

The City's WTP was constructed in 1971 and was originally designed for a capacity of 6.0 mgd. Since that time, the plant has been expanded and now has a design capacity of 12 mgd.

The water treatment process involves a series of steps to remove suspended sediment and disinfect the water prior to distribution to customers. As a first step, incoming raw water is treated with coagulating chemicals and then held in flocculation/sedimentation basins where some of the sediments settle out. The next treatment step involves filtration of the water using dual media filters equipped with granulated activated carbon and sand media. After filtration, the water is disinfected using chlorine. After disinfection, the treated water is stored in reservoirs at the site for delivery to the distribution system.

Raw water quality varies throughout the year, which presents challenges at the treatment plant. During the winter months, especially after heavy rain, raw water from the Sacramento River is very turbid with high total organic compound concentrations and low alkalinity. The WTP is challenged to treat this water effectively and at times blending with Lake Berryessa water may be required.

The plant was modified in 2006 to increase its reliability, flexibility, and redundancy so that it can effectively treat 12 mgd throughout the year. The modifications enable the plant to effectively treat water all year, and to stay in compliance with current and anticipated water quality regulations. The modifications provided additional sedimentation facilities, additional filters, and more flexibility to operate the filters, and a new tank to more easily meet disinfection requirements.

4.3.4 Treated Water Distribution System

The water distribution system delivers treated water to the residential, commercial, and industrial customers within the City's service area. The distribution system consists of three main pressure zones. The zones are served by 5 storage reservoirs, 3 pumping stations, and 9 pressure reducing stations. The water distribution pipeline system is composed of 4-inch to 36-inch diameter pipelines.

4.4 Water Supply Contracts

The City currently holds contracts and/or rights to water from the Sacramento Delta and Lake Berryessa, which are the two major surface water bodies providing supply to the City. Table 4-1 summarizes the City's contracts and the maximum amount that could be supplied from each water source, without considering the reliability of supply due to the effects of droughts or other reductions. Water supply reliability is discussed in Section 5.

Table 4-1. Current Supply Amounts by Contract or Water Rights

Source[1]	Contract or Water Right (AFY)
State Water Project (SWP) [2]	16,075
Water Rights Settlement	10,500
Lake Herman	500
Vallejo Agreement (Solano Project water from Lake Berryessa)	1,100
Solano Irrigation District Agreement (Solano Project water from Lake Berryessa)	2,000
Total	**30,175**

[1] The City also has 2,000 AF of water banked through the Mojave Exchange. This water is not included in Table 4-1 because it must be used prior to 2015. This exchange agreement has been terminated. See Section 4.4.6 for more information.

[2] Supply quantity shown for SWP assumes that Rio Vista and Dixon may take SWP water in the future. See Section 4.4.1.

4.4.1 State Water Project

The City receives State Water Project (SWP) water through an agreement with SCWA. SCWA contracts with DWR for the SWP water (called Table A water), and in turn contracts with cities in Solano County to provide this supply. The water supply for the SWP comes from Lake Oroville and water rights for flows in the Sacramento and San Joaquin River systems. The SWP contract runs to year 2035 and is renewable.

DWR diverts water under an appropriative right that allows diversion of water that is not needed to meet in-Delta needs or outflow needs. In California, courts have held that appropriative water rights may be limited under the Public Trust Doctrine. The Public Trust Doctrine encompasses many competing interests including navigation, environmental protection, water quality, and water supply for irrigation, business, and domestic use. The doctrine is usually interpreted as a result of a legal challenge made by a party with an investment in one of these interests.

The City's current SWP contract amount is 17,200 AFY. In 1985, the Cities of Benicia, Fairfield, and Vacaville agreed to reduce their annual allotment in order to provide SWP water to the Cities of Rio Vista and Dixon. Rio Vista and Dixon must develop facilities to use the SWP water by 2016. It is anticipated that Rio Vista and Dixon will not receive SWP water until 2016; therefore, the City's SWP allotment would not reduce before then. The City's contract reduction may vary, but will not diminish from year to year, and shall in no event exceed an ultimate total annual reduction of 1,125 AF. The initial reduction in annual contract shall not exceed 225 AF and the increase in the reduction in any year shall not exceed 225 AF unless agreed upon by the City. To be conservative, it will be assumed that the City's annual allotment will reduce by 225 AF each year, starting in 2016 and continuing through 2020. For 2020 through 2035, the City's SWP allotment is assumed to be 16,075 AFY.

4.4.2 Water Rights Settlement

The City of Benicia, along with the Cities of Fairfield and Vacaville, asserted a priority right with the State of California for water from the Sacramento-San Joaquin Delta pursuant to the Watershed-of-Origin Statute. The purpose of the statute, in part, is to reserve for the areas where water originates a right to such water for future needs that is preferential to the right of outside areas. DWR filed a protest on the cities' applications with the State Water Resources Control Board (SWRCB). Prior to the SWRCB hearing, DWR and the cities negotiated a comprehensive settlement that would provide water to the cities. The subsequent settlement and conveyance agreements define the basis on which water is made available to SCWA for use in the cities' service areas and how the existing DWR facilities would be used to convey the water to the cities.

DWR diverts water under an appropriative right that allows diversion of water that is not needed to meet in-Delta needs or outflow needs. In California, courts have held that appropriative water rights may be limited under the Public Trust Doctrine.

The "Area of Origin" Water Rights Settlement with DWR provides the City with 10,500 AFY of water from the Sacramento River that is not SWP water; it is non-Project water as defined by the settlement agreement. This is a permanent allocation of water supply. The amount of water was based on projected water needs to meet the City's General Plan demands. The Settlement Agreement allows the City to apply in the future to the SWRCB for a Watershed of Origin appropriation higher than the Settlement Agreement amount if demands exceed those upon which the Agreement was based. The Settlement Agreement runs through 2035 and is renewable under the same terms as the SWP contract.

Settlement Water is conveyed through the NBA when capacity is available and delivered to the City in the same manner as SWP water. The City can preferentially use Settlement Water during the periods when it is available and capacity is available. The City typically uses its Settlement Water in the spring and fall when it is most often available.

Settlement Water is restricted or not available when Standard Water Right Term 91 is in effect. Term 91 is declared by the SWRCB when it is determined that the SWP and U.S. Bureau of Reclamation's Central Valley Project (CVP) are required to release stored water in excess of low natural flow to meet Sacramento Valley in-basin uses plus export demands. Natural flow is the flow that would have been in existence if the dams were not there. Term 91 is declared in the summer of all but very wet years.

Settlement Water can be taken when the Delta is in excess conditions or when the Delta is in balanced conditions as long as Term 91 is not in effect. Balanced conditions in the Delta are defined as the periods when releases from upstream SWP and CVP reservoirs plus unregulated flow approximately equal the water supply needed to meet all Sacramento Valley in-basin uses plus export demands. During balanced

conditions, the SWP and CVP are releasing water from reservoir storage to meet their water delivery obligations.

4.4.3 Lake Herman

Lake Herman is located in the hills between Benicia and Vallejo and has a storage capacity of 1,400 AF. The dam that created Lake Herman was constructed in 1905 and raised in 1943 to its current height. Section 2.2 discusses the City's watersheds including the Sulphur Spring Creek watershed that includes Lake Herman. The average yield of its watershed is 500 AFY to 1,000 AFY, with no yield in dry years. The lake serves as terminal storage for excess supply delivered to the City through the NBA, as described in Section 4.3.2.

Pumped raw water from the NBA or Putah South Canal is delivered to the City's treatment facility at a diversion structure. Since the pump stations operate at a fixed speed, surplus flow not needed at the plant is diverted by gravity to Lake Herman through a 24-inch diameter pipeline.

The City has the ability to pump water from Lake Herman back to the treatment facility through the Lake Herman Pump Station. This is typically done during emergencies when supply from the NBA or Putah South Canal is not available. The pump station has a total pumping capacity of 9.6 mgd.

4.4.4 Vallejo Agreement (Solano Project Water)

The City currently has an active water purchase agreement with the City of Vallejo. The agreement was executed in 1962 and has been amended twice. The second amendment extended the expiration date of the agreement to February 28, 2025. It is assumed that this agreement will be renewed at its expiration.

The agreement allows the City to purchase up to 1,100 AFY of Vallejo's Solano Project water from Lake Berryessa. The agreement also provides that the City can receive up to 3 mgd of the water as treated water, in lieu of raw water, by means of an inter-connection between the Benicia and Vallejo treated water systems, which does not currently exist. Currently the City can only receive raw water from Vallejo by means of the Cordelia Pump Station and Cordelia Pipeline. In order to receive treated water, a new interconnection would be required. The agreement provides that shortages (reductions) experienced by Vallejo may be passed on to Benicia.

The City previously had a second agreement with Vallejo for purchase of 4,400 AFY from various sources. This agreement was seldom exercised and was terminated in 2004.

4.4.5 Solano Irrigation District

SID is the holder of a contractual right to receive allotments from the Solano Project as a Participating Agency of the SCWA under the terms of a Participating Agency Contract providing for the delivery of and allotment of 141,000 AFY from the Solano Project to SID. In March 2009, the City entered into a purchase agreement with the SID to provide 2,000 AFY. Water will be provided through water deliveries from Lake Berryessa and the Putah South Canal of the Solano Project. There is no specified date of termination of the agreement as long as SID maintains the adequate water rights from SCWA, and payments to SID are met. The agreement is subject to a reduction in supply based on drought conditions.

The SID water was purchased to improve drinking water quality when the water drawn from the Delta through the NBA is high in algae. This water source can be counted towards the total water available, but was not intended to increase availability for future growth. Any new water use of any significance would have to be analyzed in this context.

4.4.6 Mojave Banking and Water Exchange

The City, as member of the SCWA, is entitled to participate in a banking and water exchange program with the Mojave Water Agency (Mojave), another SWP contractor. Mojave serves a portion of the high desert region north of the San Gabriel Mountains in Southern California. It overlies a large groundwater basin that can meet nearly all of its demands in dry years. This allows Mojave to operate the basin conjunctively with surface water supplies from the SWP. Available surface water is stored in the groundwater basin.

SCWA had an agreement with Mojave to exchange wet weather SWP water for dry year SWP water. Mojave and SCWA also have agreements with DWR to transport the exchange water through SWP facilities. According to the agreement, SCWA (or its members) can exchange two units of SWP water for a future return of one unit of SWP water to be provided at the Delta by Mojave. In wet years, the City would send SWP water to be "banked" or "stored" in Mojave's groundwater basin. During dry years, the City can recover one-half of its stored water through the NBA from Mojave's SWP allocation, while Mojave uses its groundwater to replace the SWP water that goes to the City. There is no physical transfer of water; the City's volume of stored water is tracked in an account and deducted when the City takes Mojave's SWP allocation through the NBA. There is no monetary cost for the Mojave Exchange water.

The agreement with Mojave was terminated in 2007. The City still has access to 2,000 AF of banked water. One thousand AF must be recovered by 2014, and the remaining 1,000 AF must be recovered by 2015 or Benicia loses the rights to the water. The Assistant Director of Public Works will ensure the water is utilized.

4.5 Other Water Sources

4.5.1 Transfer or Exchange Opportunities

Transmission facilities from the Delta via the NBA and Lake Berryessa via the Putah South Canal allow for a variety of short- or long-term water transfer or exchange options. Such transfers or exchanges might occur with other NBA members, other SWP entities, or Solano Project members. These shared opportunities highlight the value of statewide and regional water management planning efforts. Two specific options currently available to the City are:

- ***Storage Agreement for Solano Project Water*** – The City has a storage agreement with SCWA that provides an option to store up to 9,000 AF in Lake Berryessa for use as emergency supply. To exercise this agreement, Benicia must exchange a portion of its SWP water (Table A water) water for Solano Project water or purchase it from other members that have the capability to use either source. The other entity uses the NBA water and foregoes the use of the Solano Project water. The City has not exercised this agreement to date since it specifies that the first Project water spilled (released over the dam), if the lake is full, is Benicia's water whether the City needs it at the time or not. The City would only consider exercising this agreement if lake levels were low enough that it was not likely that the lake would spill.

- ***Solano Project Drought Measures Agreement*** - The Solano Project contracting cities (Fairfield, Vacaville, Vallejo, and Suisun City) have an agreement with the two agricultural Solano Project contracting districts (SID and Maine Prairie Water District) to share water supplies during drought periods. Benicia is not a member of the Project, since the City relinquished its contractual rights to Solano Project water when SWP water was made available. However, Project members may transfer water from the Solano Project to the City. The region has historically cooperated in this regard to collectively maintain the interdependent urban and agricultural economies of the region.

The general types of transfers or exchanges that the City can continue to use, if needed, are summarized below:

- ***Core Transfers*** make water available through multi-year contracts that convey a specific amount of water to the purchaser each year. The specific conditions depend on the agencies involved and contract terms. Examples include the City's 2009 agreement with SID and its 1962 agreement with the City of Vallejo.
- ***Spot Transfers*** make water available for a limited duration (typically one-year or less) through a contract executed during the year of delivery. Some examples of spot transfers are the State Drought Water Bank in the critically dry year of 1991, the State's voluntary water purchase program in 2001, and Benicia's previous short-term agreements with SID.
- ***Option Transfers*** are multi-year contracts that allow the purchaser to obtain a specified quantity of water at some future date. They usually require a minimum payment for water even if the water is not needed in a given year. An option or "take" price is established in years water is drawn.
- ***Storage Agreements*** allow one entity to lease or purchase storage in another entity's surface or groundwater storage facility. An example is Benicia's storage agreement for Solano Project water.
- ***Water Exchanges*** are agreements that allow two agencies to exchange water from one source for water from another source, typically during the same year. Exchanges can also occur with the same source where one agency exchanges its right to take water at a given time from the source with another agency, and then can take the water from the source at another time. Exchanges can also involve storage agreements. An example is Benicia's participation in the Mojave Banking and Water Exchange.

4.5.2 Groundwater

The City currently does not use groundwater as a potable water source and has no plans to use groundwater in the future.

4.5.3 Indirect Potable Water Reuse

The City currently does not have any plans for implementing indirect potable water reuse.

4.5.4 Desalinated Water

Desalination involves removing salts and impurities from seawater or non-potable surface water or groundwater using treatment technologies such as reverse osmosis membranes or distillation methods. Desalination facilities are costly to construct and operate relative to the City's current supply sources. There are also significant environmental and permitting issues associated with the water intake and with disposal of brine from the treatment process. The City currently does not have any plans for implementing desalinated water.

4.5.5 Recycled Water

The City provides wastewater collection, treatment, and disposal services to customers within its service area. The City's wastewater collection system consists of approximately 150 miles of pipelines and 24 lift stations. The majority of the collection system relies on gravity flow through the pipelines. Due to terrain restrictions, it also relies on 24 pump stations to transport the collected wastewater from low points to suitable locations for continued transmission by gravity.

The City operates and maintains a 4.5-mgd wastewater treatment plant (WWTP) facility located on seven acres of land at the south end of East 5th Street. The WWTP provides secondary treatment to domestic, commercial, and industrial wastewater. The facility receives flows from two main service areas: the predominantly residential area located west of the plant and the predominantly industrial area located east of the plant. Average dry weather effluent flow from the WWTP in 2010 was 2.1 mgd and is projected to increase to 2.7 mgd at build-out. Treated wastewater or effluent is discharged into the Carquinez Strait of the San Francisco Bay via a deep water outfall.

The City and the Valero Refinery have completed a preliminary design report to upgrade the WWTP to tertiary treatment allowing for non-restricted recycled water reuse of effluent. The project would involve expansion of the wastewater treatment facility to include microfiltration/reverse osmosis and nitrifying trickling filters. The initial concept is to provide up to 2 mgd of recycled water for use by the refinery as cooling tower make-up water. However, at the direction of the City Council, this project has been put on hold pending the availability of project funding, in the amount of approximately $40 million.

4.5.6 Potential Future Water Supply and Storage Opportunities

The following projects are being developed through the Solano Water Authority (SWA). The SWA is a joint powers authority made up of eleven Solano County agencies, including the seven cities, three agricultural districts, and the County. The SWA, through the Joint Exercise of Powers Agreement, provides a mechanism whereby the agencies may participate in jointly funded water projects for their mutual benefit.

- **Noonan Reservoir.** This proposed project would construct a joint use water storage reservoir benefitting municipal interests in Solano County and SID. The reservoir would be located on the southerly side of the Putah South Canal between Fairfield and Vacaville. The reservoir would provide the capability of commingling and storing both NBA and Solano Project water supplies. The project would provide the flexibility for public agencies within Solano County (Benicia is a participant) to enter into water exchange agreements or wheeling agreements for NBA and Solano Project water.

- **Highline Canal.** Considered an initial stage of the Noonan Reservoir project, although also a standalone project, the Highline Canal project would allow project participants to exchange NBA water for Solano Project (Lake Berryessa) water, presently used in SID's Dally service area (west of Travis Air Force Base). The proposed project includes a pump station on the NBA and a pipeline from the pump station to the head of SID's Dally Highline Canal. The benefits of the project for the City are related to both water quality improvement and water supply. With the project, the City will be able to deliver NBA water to SID at times during SID's irrigation season. In exchange, SID would provide the City with Solano Project water that would be used at other times of the year when either the NBA is shut down due to maintenance or because of environmental constraints. SCWA's IRWMP, with the City as a participant, includes a high priority action to work with DWR and other agencies to explore water supply and storage opportunities that could increase the reliability of Solano County's water supplies. Storing water in wet years for later use in drier years would help Solano water agencies maintain reliable water supplies. Storage could be in the form of groundwater banking (groundwater storage) or surface water storage. The City participates in these regional planning efforts through the SCWA.

The SCWA IRWMP includes a high priority item to identify opportunities for conjunctive groundwater use as a means of increasing water supply and reliability. Conjunctive use projects integrate the use of groundwater and surface water. The surface water provides supplies to local users and recharges the groundwater basin in normal or wet years. Groundwater in storage then provides supply during drier years when surface supplies are reduced. Agencies within the County with good groundwater resources would

use groundwater during dry years, which would free up more surface water for those agencies that have poor quality groundwater, such as the City of Benicia.

SCWA's IRWMP also identifies new surface water storage within Solano County as a potential long-term option to help meet future demands by storing water during normal-to-wet years when water is available so that the stored water would be available during drier years when other supplies, such as the SWP, are reduced. Additional evaluations are needed to determine whether such facilities are feasible. For example, the idea of using Delta Islands as surface storage sites has been discussed; however, there are major issues with respect to levee stability/vulnerability and seepage. This potential supply option would be investigated as part of the regional water management planning efforts that include the City as an active participant.

Section 5
Water Supply Reliability and Shortage Contingency Plan

5.1 Law

10620 (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.

10631 (c) (1) 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:

- An average water year.
- A single dry water year.
- Multiple dry water years.

10631 (c) (2) 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.

10631 (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.

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

10632 (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.

10632 (b) An estimate of the minimum water supply available during each of the next three years based on the driest three-year historic sequence for the agency's water supply.

10632 (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.

10632 (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.

10632 (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.

10632 (f) Penalties or charges for excessive use, where applicable.

10632 (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.

10632 (h) A draft water shortage contingency resolution or ordinance.

10632 (i) A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.

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 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.

5.2 Introduction

This section of the UWMP describes factors that affect water supply reliability, estimates a minimum three-year supply for current sources, and compares existing water and planned water supplies with projected water demand between 2010 and 2035. This evaluation of water reliability requires the integration of information provided in previous sections of this UWMP including Section 3, which presents the City's projection of water demand before conservation and quantifies additional demand reduction needed to meet new requirements from the recently adopted Water Conservation Bill. Also critical to assess reliability is information from Section 4 describing and quantifying the various sources of water supply available to meet water demands.

Several factors affect water supply reliability in the City's service area, including:

- Existing or potential water quality issues;
- Potential impacts of long-term climate change;
- Environmental issues; and
- Facility constraints.

The impact of these factors on supply yield depends upon many factors unique to each type of supply, as summarized in Table 5-1 and described further below. Section 5.3 summarizes the reliability of each source of supply and the influence of reduced yields on the City's ability to meet current and projected water demand.

Table 5-1. Factors Influencing Water Supply Reliability

Water Supply Source	Water Quality	Climate Change	Environmental Issues	Facility Constraints
SWP Table A	X	X	X	X
Area of Origin Settlement	X	X	X	X
Lake Herman		X		
Solano Project Water Transfers		X		

Reductions from normal supply volume are a result of these factors. To assess the impact of these factors on current water supplies, Table 5-2 provides an estimate of the minimum water supply volume from each source that may be available to the City during each of the next three years.

Table 5-2. Estimated Minimum Water Supply Over the Next Three Years

Water Supply Source [1]	Normal Hydrologic Year Condition (AFY)	Multiple Dry Year Hydrologic Condition (AFY)		
		2011	2012	2013
SWP Table A	11,008	5,532	5,532	5,532
Area of Origin Settlement	7,560	7,350	7,350	7,350
Lake Herman	500	0	0	0
Solano Project Water Transfers	3,069	2,759	2,759	2,759
Mojave Banking and Water Exchange	0	0	0	0
Total	22,137	15,641	15,641	15,641

[1] Estimated water supplies shown are based on each supplies contract quantity (see discussion in Section 4.4) and the reliability of the supply in each type of water year (see discussion below in Section 5.3).

5.3 Water Reliability by Source

5.3.1 State Water Project

The Bay-Delta is a major waterway at the confluence of the Sacramento and San Joaquin Rivers serving multiple and at times conflicting purposes, exacerbated during dry years when sufficient water to meet the needs of both people and the environment is in short supply. Approximately two-thirds of Californians receive at least a portion of their water from the Bay-Delta. Almost all water delivered via the SWP to southern California must pass through the Bay-Delta.

Contractors' requests for portions of their contracts cannot always be met. In some years there are shortages and in other years surpluses. In 2008 and 2009, SWP contractors received only 35 percent and 40 percent, respectively, of their SWP contract allocations.

DWR completed its 2009 update to the State Water Project Delivery Reliability Report in August 2010. Projected reliability in the 2009 update shows a decrease in the long-term average reliability of water supplies from the SWP and increased reductions when compared to the previous 2007 report.

DWR developed the CALSIM II water resource simulation model to assess a variety of potential future water supply and demand scenarios for the SWP. Historical meteorological data are used in the CALSIM II model to simulate current and future SWP reliability over an 82-year range (1922-2003) of hydrologic year types. The 2009 update of this model incorporates new data on climate change and pumping restrictions to project SWP reliability for varying hydrologic conditions. The results of the model show that the long-term average reliability of the SWP is 60 percent. Expected deliveries for multiple-dry year periods will vary from 32 to 38 percent of maximum Table A amounts and for multiple-year wet periods 72 to 93 percent of maximum Table A amounts. Figure 5-1 shows the distribution of modeled SWP reliability for all 82 years of simulation for the portion of deliveries to SCWA that are contracted to Benicia (long-term maximum of 16,075 AFY of SCWA's 47,400 AFY SWP Table A allocation). For example, the chart shows that in 80 percent of years, there will be at least 7,000 AFY of supply available to the City.

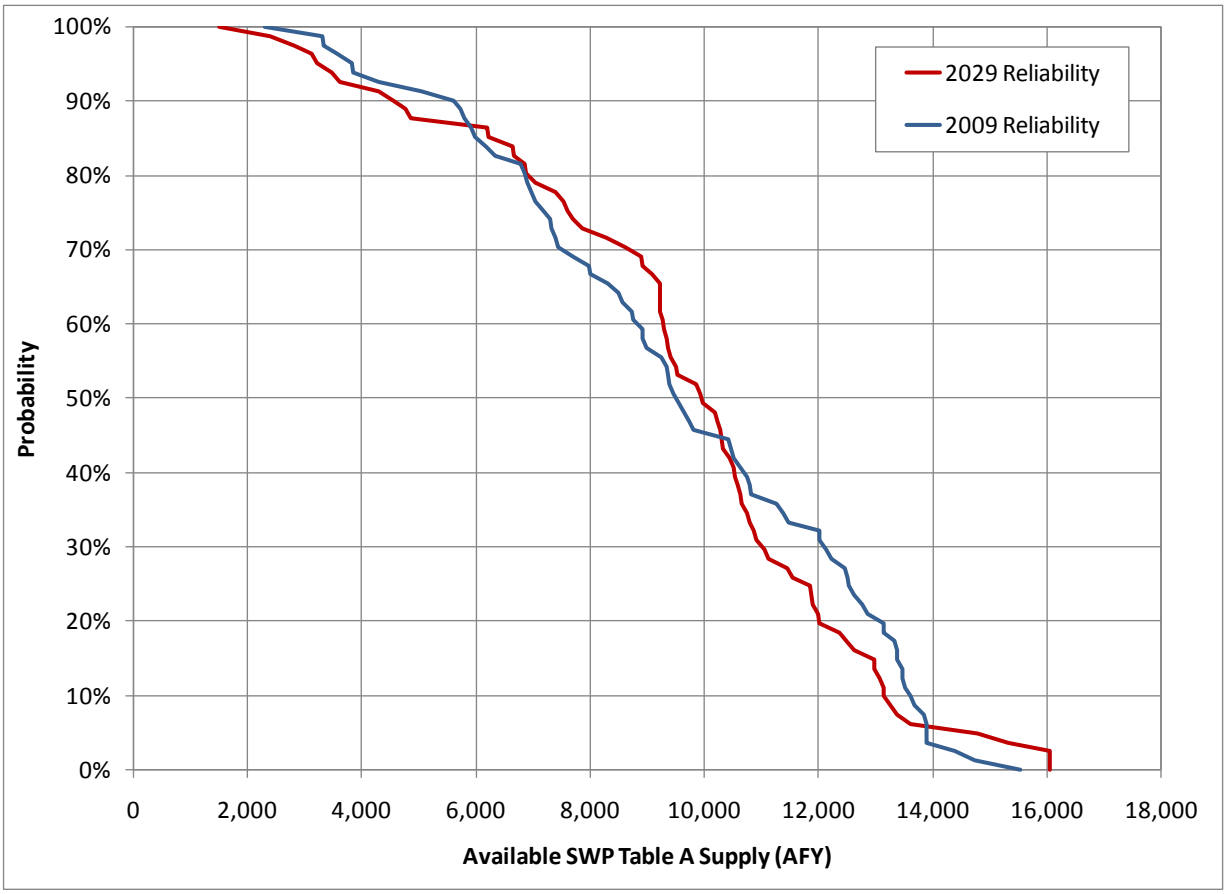

Figure 5-1
Probability Curve showing Reliability of the City's Portion of the SCWA Table A Allocation based on the DWR 2009 Reliability Report

The primary factors that affect the reliability of the SWP are long-term climate change and pumping restrictions to protect fish species listed as threatened and endangered under the federal or state Endangered Species Acts in the Bay-Delta. Additional factors affecting SWP reliability include infrastructure concerns, hydrologic variability, litigation, and water quality issues that have resulted in supply reliability challenges for SWP contractors. Uncertainty related to climate change and pumping restrictions are incorporated into the 2009 CALSIM II model update of SWP reliability as follows:

- The primary effects of climate change to the Delta supply include, more precipitation falling as rain than snow, reduced Sierra snowpack, shifted timing of snowmelt runoff into streams (spring runoff comes earlier resulting in increased winter flows and decreased spring flows), and more severe flood events. Estimates of climate change are developed from downscaled global climate models (GCM). The GCM used for the 2009 update was selected because it provided the median reduction in SWP reliability from an uncertainty analysis spanning 12 different downscaled GCMs.

- Restrictions on Delta pumping required by the biological opinions issued by the U.S. Fish and Wildlife Service (December 2008) and National Marine Fisheries Service (June 2009). The 2009 CALSIM II model assumes operations necessary to achieve the requirements of these recently adopted biological opinions and assume there is no future change in how water flows across the Delta. If the current conveyance systems in the Delta are improved in the future, SWP reliability would improve from the values reported in this 2009 update. Considering the recently approved Delta Vision plan, there is a high potential for future updates to the DWR State Water Project Delivery Reliability Report to reflect plans for additional facilities that would then improve reliability. These updates will be incorporated into subsequent UWMPs for the City.

For the UWMP, supply projections must be developed for normal, single-dry, and multiple dry hydrologic year conditions. SCWA interpreted the DWR reliability analysis for 82 years of hydrology and provided its member agencies with reliability estimates for these three hydrologic conditions. These reliability estimates are included in Appendix E.

SCWA used the Sacramento Valley Index (SVI)[1] to determine dry hydrologic years in the 82-year hydrologic period of simulation. To estimate reliability for the multiple dry year hydrologic condition, SCWA took an average of DWR projected 2029 SWP reliability for all years that were part of a three year or longer SVI dry hydrologic sequence. For the single-dry year hydrologic condition, SCWA took an average of DWR projected 2029 SWP reliability in the first SVI dry year of a multiple SVI dry period and any single instances of an SVI dry year. This approach resulted in estimated SWP Table A reliability of 46 percent for single dry and 31 percent for multiple dry hydrologic year conditions. SCWA also estimated SWP Table A reliability during years categorized as normal according to the SVI. The average of DWR projected 2029 SWP reliability for all SVI normal hydrologic years is 64 percent. These reliability factors applied to the long-term Table A allocation of 16,075 AFY, results in yields of 10,288 AFY, 7,395 AFY, and 4,983 AFY, for normal, single-dry, and multiple dry hydrologic years types, respectively.

5.3.2 Settlement Water

Settlement Water is available in quantities up to the available conveyance capacity in any month when the SWRCB Standard Water Right Term 91 is not in effect. Term 91 is a condition when the SWP and CVP are required to release stored water to meet minimum environmental Delta flow thresholds and water quality standards, and export demands. The NBA conveys both SWP Table A and Settlement Water to the City. To maximize supply from both sources, the City preferentially uses the NBA to convey Settlement Water

[1] The Sacramento Valley Index is a calculated estimate of the unimpaired runoff from the Sacramento River and its major tributaries and is used to determine water year type.

during the periods when it is available and reserves it use of Table A deliveries during months when Term 91 is in effect, which is generally the summer season.

The City conducted an analysis using the CALSIM model to determine the delivery capability for Settlement Water over the same period of historical record as for SWP deliveries, to test the reliability impacts of the following constraints:

- Conveyance capacity in the NBA for all North Bay SWP contractors;
- Occurrence of Term 91 months; and
- City of Benicia monthly water demand.

As shown in Table 5-3, the results of this analysis showed that 7,560 AFY of the City's 10,500 AFY settlement water rights (approximately 72 percent) are usable in a normal hydrologic year. The simulated potential for use of Settlement Water during single-dry and multiple-dry hydrologic years is similar to normal hydrologic years. Appendix F contains a description of the reliability analysis for Settlement Water availability.

Table 5-3. Reliability Factors for the City's Settlement Water

Hydrologic Condition	Settlement Water at Buildout Demand (AFY)	Percent of Contract
Normal	7,560	72%
Single Dry Year	7,560	72%
Multiple Dry Years	7,350	70%

Source: CH2MHILL, Supplemental Water Supply Assessment in Support of the City of Benicia Urban Water Management Plan, October 23, 2005. See Appendix F.

5.3.3 Lake Herman

During dry years, there are no watershed runoff inputs to Lake Herman; therefore, its reliability during single or multiple dry years is considered to be zero. However, Lake Herman does serve as an emergency storage reservoir for the City, if there is water already stored in the lake. As discussed in Section 4.3.3, excess supply conveyed to the City's treatment plant from the NBA is diverted into the lake if not needed to meet the City's demands. Its use for emergency supply is discussed further in Section 5.6.6.

5.3.4 Solano Project

Historically, the City has never experienced cutbacks on Solano Project water from Lake Berryessa received through their Vallejo Agreement. For the Solano Project, the full contract amount is delivered unless it is physically impossible to do so due to low lake levels. The Solano Project Members' Agreement as to Drought Measures and Water Allocation (effective January 25, 1999) specifies reductions in deliveries as a function of storage in Lake Berryessa. If the storage level drops below 800,000 AF, as measured on April 1 of any year, deliveries are reduced to 95 percent of the contract amounts, with 5 percent being stored in the reservoir as carryover. If the storage level drops below 550,000 AF, as measured on April 1 of any year, deliveries are reduced to 90 percent of the contract amounts, with 10 percent being stored in the reservoir as carryover.

In August 2010, SCWA provided an analysis of reliability of Solano Project supply based on lake levels during the historical period of record from 1906 through 2007. The analysis estimated reliability for

normal, single-dry, and multiple dry year hydrologic conditions, as shown in Table 5-4, using the SVI developed by SCWA for the watershed. Similar to its calculations for SWP supply reliability, SCWA estimated multiple dry year reliability by averaging the Solano Project reliability for all years that were part of a three year or longer dry hydrologic sequence. For the single-dry year hydrologic condition, SCWA took an average of Solano Project reliability for the first dry year of a multiple dry period and any single instances of a dry year. Appendix G contains a copy of the SCWA reliability estimates for the Solano Project.

Table 5-4. Reliability Factors for the City's Solano Project

Hydrologic Condition	Solano Project Water Reliability at Buildout Demand	Transfers to City of Benicia from Vallejo and SID Agreements (AFY)
Normal	99%	3,069
Single Dry Year	98%	3,038
Multiple Dry Years	89%	2,759

Source: SCWA, Solano Project Reliability. See Appendix G.

The main factor affecting Solano Project reliability is the frequency of long droughts which could result in major drawdown of Lake Berryessa. Environmental issues have been addressed in a legal settlement regarding downstream flows from the Solano Project with respect to instream flows in lower Putah Creek, and the settlement has been ratified by the State Water Resources Control Board.

5.3.5 Mojave Banking and Water Exchange

The City currently has stored 2,000 AF with Mojave. Per the agreement, 1,000 AF of the banked storage must be used prior to 2014 and the remaining 1,000 AF must be used prior to 2015. This water is 100 percent reliable, but will not be available after 2015.

5.4 Water Reliability by Categorical Year Type

The water supply reliability assessment shown in Tables 5-5 through 5-7 presents comparisons of water supply and demand for three categories of hydrologic condition: normal, single dry year, and multiple dry years. Results of the comparisons show surpluses of water supply compared with demand during normal and dry year conditions. The data used to develop these comparisons reflects the variability in Lake Herman watershed runoff, SWP Table A, Settlement contract, and Solano Project water transfers. The remaining 2,000 AF of banked water in the Mojave is assumed to be extracted in 1,000 AF increments for planning years 2014 and 2015 to meet the required timeline for use of this banked water source.

Table 5-5. Water Supply and Demand Comparison for a Normal Hydrologic Condition

Supply / Demand (AFY)	2010	2015	2020	2025	2030	2035
SWP Table A	11,008	11,008	10,288	10,288	10,288	10,288
Area of Origin Settlement	7,560	7,560	7,560	7,560	7,560	7,560
Lake Herman	500	500	500	500	500	500
Solano Project Water Transfers	3,069	3,069	3,069	3,069	3,069	3,069
Mojave Banking and Water Exchanges	0	1,000	0	0	0	0
Total Supply	22,137	23,137	21,417	21,417	21,417	21,417
Demand Projection[1]	10,863	11,094	11,728	11,804	11,883	11,940
Additional Conservation[2]	0	0	0	0	0	0
Total Demand	10,863	11,094	11,728	11,804	11,883	11,940
Surplus[3]	11,274	12,043	9,689	9,613	9,534	9,477
Surplus as % of Supply	51%	52%	45%	45%	45%	44%
Surplus as % of Demand	104%	109%	83%	81%	80%	79%

(1) Includes untreated demands for both Valero and operations and emergency supply.
(2) Current estimate of demand reduction needed to achieve 2020 urban water use target of 180 gpcd.
(3) Total supply minus total demand.

Table 5-6. Water Supply and Demand Comparison for a Single-Dry Year Hydrologic Condition

Supply / Demand (AFY)	2010	2015	2020	2025	2030	2035
SWP Table A	7,912	7,912	7,395	7,395	7,395	7,395
Area of Origin Settlement	7,560	7,560	7,560	7,560	7,560	7,560
Lake Herman	0	0	0	0	0	0
Solano Project Water Transfers	3,038	3,038	3,038	3,038	3,038	3,038
Mojave Banking and Water Exchanges	0	1,000	0	0	0	0
Total Supply	18,510	19,510	17,993	17,993	17,993	17,993
Demand Projection[1]	10,863	11,831	12,460	12,537	12,615	12,673
Additional Conservation[2]	0	0	0	0	0	0
Total Demand	10,863	11,094	11,728	11,804	11,883	11,940
Surplus[3]	7,647	8,416	6,264	6,188	6,109	6,052
Surplus as % of Supply	41%	43%	35%	34%	34%	34%
Surplus as % of Demand	70%	76%	53%	52%	51%	51%

(1) Includes untreated demands for both Valero and operations and emergency supply.
(2) Current estimate of demand reduction needed to achieve 2020 urban water use target of 180 gpcd.
(3) Total supply minus total demand.

Table 5-7. Water Supply and Demand Comparison for a Multiple-Dry Year Hydrologic Condition

Year	Supply / Demand (AFY)	2010	2015	2020	2025	2030	2035
First Year of Supply	SWP Table A	5,332	5,332	4,983	4,983	4,983	4,983
	Area of Origin Settlement	7,350	7,350	7,350	7,350	7,350	7,350
	Lake Herman	0	0	0	0	0	0
	Solano Project Water Transfers	2,759	2,759	2,759	2,759	2,759	2,759
	Mojave Banking and Water Exchanges	0	1,000	0	0	0	0
	Total Supply	15,441	16,441	15,092	15,092	15,092	15,092
	Demand Projection(1)	10,863	11,094	11,728	11,804	11,883	11,940
	Additional Conservation(2)	0	0	0	0	0	0
	Total Demand	10,863	11,094	11,728	11,804	11,883	11,940
	Surplus(3)	4,578	5,347	3,364	3,288	3,209	3,152
	Surplus as % of Supply	30%	33%	22%	22%	21%	21%
	Surplus as % of Demand	42%	48%	29%	28%	27%	26%
Second Year of Supply	SWP Table A	5,332	5,332	4,983	4,983	4,983	4,983
	Area of Origin Settlement	7,350	7,350	7,350	7,350	7,350	7,350
	Lake Herman	0	0	0	0	0	0
	Solano Project Water Transfers	2,759	2,759	2,759	2,759	2,759	2,759
	Mojave Banking and Water Exchanges	0	1,000	0	0	0	0
	Total Supply	15,441	16,441	15,092	15,092	15,092	15,092
	Demand Projection(1)	10,863	11,094	11,728	11,804	11,883	11,940
	Additional Conservation(2)	0	0	0	0	0	0
	Total Demand	10,863	11,094	11,728	11,804	11,883	11,940
	Surplus(3)	4,578	5,347	3,364	3,288	3,209	3,152
	Surplus as % of Supply	30%	33%	22%	22%	21%	21%
	Surplus as % of Demand	42%	48%	29%	28%	27%	26%
Third Year of Supply	SWP Table A	5,332	5,332	4,983	4,983	4,983	4,983
	Area of Origin Settlement	7,350	7,350	7,350	7,350	7,350	7,350
	Lake Herman	0	0	0	0	0	0
	Solano Project Water Transfers	2,759	2,759	2,759	2,759	2,759	2,759
	Mojave Banking and Water Exchanges	0	1,000	0	0	0	0
	Total Supply	15,441	16,441	15,092	15,092	15,092	15,092
	Demand Projection(1)	10,863	11,094	11,728	11,804	11,883	11,940
	Additional Conservation(2)	0	0	0	0	0	0
	Total Demand	10,863	11,094	11,728	11,804	11,883	11,940
	Surplus(3)	4,578	5,347	3,364	3,288	3,209	3,152
	Surplus as % of Supply	30%	33%	22%	22%	21%	21%
	Surplus as % of Demand	42%	48%	29%	28%	27%	26%

(1) Includes untreated demands for both Valero and operations and emergency supply.
(2) Current estimate of demand reduction needed to achieve 2020 urban water use target of 180 gpcd.
(3) Total supply minus total demand.

5.5 Water Quality

Water quality from the Solano Project (Lake Berryessa) is good for municipal and industrial uses. Much of its watershed is in a natural state, although there is some urban and agricultural development. No water quality degradation is expected that would impact its reliability.

Delta water from the NBA is generally of lesser quality than Solano Project water and requires more rigorous treatment. Poor NBA water quality particularly occurs in the winter when runoff from the Barker Slough watershed is pumped into the NBA. During the winter months, especially after heavy rain, water supplied from the NBA can be very turbid with high total organic content from grazing lands and low alkalinity, which make it difficult to treat effectively.

Although NBA water quality is an important issue, it does not significantly impact the reliability of the City's water supply. The City has taken measures to address water quality issues both operationally and with treatment plant improvements. The City currently uses its better quality Solano Project water transfers to blend with NBA water during parts of the year that NBA water quality is poor. In addition, the City implemented significant modifications at its WTP to increase its reliability, flexibility, and redundancy so that it can effectively treat NBA water all year, and stay in compliance with current and anticipated water quality regulations.

As part of SCWA's IRWMP efforts, with the City as a participant, several regional actions have also been taken. SCWA has implemented best management land use practices in the Barker Slough watershed, primarily to reduce erosion from livestock grazing and other sources, which would reduce turbidity in the winter runoff season. Alternative treatment studies have been conducted to determine if there are more effective treatment technologies to improve water quality.

In addition, SCWA has completed a feasibility study to determine if an alternate intake for the NBA could be constructed at a different location closer to the Sacramento River to improve the quality and reliability of NBA water. DWR is currently studying the potential environmental impacts of the project. A draft Environmental Impact Report is anticipated in 2012. SCWA, as part of the regional planning efforts, is currently evaluating the cost of implementing these various measures to reduce water quality impacts.

5.6 Water Shortage Contingency Plan

The purpose of the water shortage contingency plan is to be prepared to impose temporary demand reductions in case available supply falls below the planned-for levels. Supplies may be reduced below the planned levels due to such causes as extreme (worst case) drought conditions, unplanned outages of water supply facilities due to earthquakes or other major disasters, prolonged power outages, or any other catastrophic loss of supply.

The City adopted its current Emergency Water Conservation Plan in 1990 through an ordinance adding to the City Code, Title 13, Chapter 13.35 (included in Appendix H). The ordinance provides for emergency water supply management related to general supply shortages due to severe droughts, infrastructure failure, or any other cause. While the current ordinance provides an adequate framework for managing supply shortages, it is in need of updating to reflect current conditions. During the 2005 UWMP development process, the City Council formed a special task force to guide the update of the plan. The Task Force provided input in recommending changes to the current ordinance; however, the recommendations were not implemented at that time because there was uncertain regarding whether additional changes would be required for the impending 20x2020 legislation. The 2005 Task Force's recommendations are included in the section below. The City will be soliciting the public's input on these recommended changes to the Emergency Water Conservation Ordinance. Section 5.6.1 further discusses this coordination.

The City also coordinates regionally through the SCWA with respect to emergency water shortage planning and response.

5.6.1 Potential Catastrophic Events

The significant catastrophic events that may affect the City's major water sources are extreme (worst case) drought, earthquake, power outage, contamination or landslide. Table 5-7 shows sufficient reliability of the City's supply sources to meet demands in the event of a drought of three consecutive dry years. Emergency response plans for regional supplies if a catastrophic event affects the NBA or the Solano Project facilities are described below:

- The NBA supplies water to the City from the SWP, Settlement Water, and Mojave Exchange water. Potential catastrophic outages may occur from earthquakes that cause major damage to the NBA facilities, prolonged loss of Pacific Gas & Electric Company power required for pumping water through the NBA, or contamination at the intake to the NBA. The NBA is an underground pipeline and not subject to landslide damage. In the event of loss of NBA supply for any reason, the SCWA member agencies, including the City, would switch to Solano Project Water supplies and/or Lake Herman supplies while the emergency condition is being resolved and water supply restored. All the NBA water users have access to Solano Project supplies in emergencies.

- The Solano Project supplies some water to the City under normal conditions, in addition to being an emergency supply source. In the event of an earthquake, the Solano Project Emergency Response Plan is invoked. The Plan, developed in coordination with the U.S. Bureau of Reclamation, provides a detailed response for various levels of seismic activities both at the dam site and within a specified geographical area surrounding the Solano Project. Under such conditions, the City would also make use of Lake Herman.

- The Putah South Canal is susceptible to a landslide which could either block or damage its ability to deliver Solano Project water. SCWA recently invested in a $3 million project to provide an underground pipeline bypass of an area that is most susceptible to a landslide. Any detection of contamination of Solano Project water would result in a shut-down of the Solano Project deliveries. The Solano Project is a gravity system and is not dependent upon power to operate. In the event of loss of Solano Project water, the City would shift to supplies delivered through the NBA including SWP water, Settlement Water, and Mojave Exchange water, or its own Lake Herman.

As future actions, the City could consider partnering with SCWA on a regional project to comprehensively assess the vulnerability of the regional facilities supplying the City with respect to seismic, flooding, and other relevant issues. SCWA is in the process of systematically improving and protecting water resources. The City has already prepared and implemented a Vulnerability Assessment addressing security of the City's distribution system facilities. In addition, the City could undertake a seismic vulnerability assessment of its distribution system facilities. Depending on the outcome of such studies, improvements may be identified for implementation to increase system reliability during non-drought events. The City could partner with SCWA to investigate regional funding opportunities for measures to improve the reliability of key water supply facilities.

In addition, ABAG provides numerous hazard planning resources on their website, including hazard maps showing areas prone to earthquake shaking, liquefaction, landslides, flooding and wildfires (see the Table of Contents of this report for the website link). ABAG is leading region-wide efforts for local hazard mitigation planning. The goal is to reduce and avoid risks from natural hazards. In March 2005, the ABAG Executive Board adopted a "Multi-Jurisdictional Local Government Hazard Mitigation Plan for the San Francisco Bay Area". This plan provides an array of potential strategies to reduce risks involving infrastructure, health, housing, the economy, government services, education, the environment, and land use. Each city in the region, including the City of Benicia, is preparing an annex to the plan identifying specific strategies appropriate for its community. There are potential funding opportunities for implementation of local hazard mitigation projects.

5.6.2 Priorities for Water Use

When demand reductions are required due to supply shortages, priorities for potable water use must be considered. Priorities for demand reductions considered in the City's plan are discussed below:

- ***First priority – maintain essential health and safety uses*** (e.g., drinking, food preparation, sanitation, fire protection).

  The minimum amount per person for drinking, food preparation, and sanitation ranges from 38 to 68 gpcd, depending on whether there are water conserving fixtures. For a 3-person household, this would be equivalent to 114 to 204 gallons per day per dwelling unit.

- ***Second priority – maintain the community's economic and jobs base.***

  Some special categories, such as gasoline and diesel fuel manufacturing (e.g., Valero Refinery) are of statewide importance. A curtailment of petroleum fuel production due to water supply shortages would cause statewide economic impacts.

- ***Third priority – discretionary/non-essential uses of existing customers.***

  Many of the non-essential uses involve outdoor water for irrigating landscape, filling swimming pools, and other similar uses. Required demand reductions typically focus heavily on reducing outdoor uses. Prohibitions for irrigation sometimes differentiate between established trees and shrubs which represent a significant investment and may take 5 to 10 years to replace, versus annual landscaping which is a lesser investment and is easily replaced.

- ***Fourth priority – new water service connections.***

  During severe supply shortages, approval of new water connections would be delayed until the shortage was resolved.

5.6.3 Stages of Action

The Act requires water agencies to plan for varying levels of temporary or prolonged shortages of up to 50 percent of normal supplies regardless of whether it may or may not happen. The City's plan provides for five stages of implementation, which include a specific water use reduction requirements and prohibited water uses, as shown in Table 5-8.

The City is always operating in Stage 1 Voluntary Conservation that provides public information and education to promote water conservation. Additional stages are implemented as needed. It is important to note that a reduction in a supply source, such as SWP water, does not necessarily trigger higher stages of action above Stage 1, since the City has many diverse sources and considerable flexibility to handle cutbacks. The overall supply available from all the City's sources is evaluated before higher stages are triggered, as appropriate for the specific conditions at the time.

Table 5-8. Water Shortage Contingency Stages of Action

Stage	Description	Reduction	Type	Water Use Prohibitions	Penalties for Excessive Water Use
1	Voluntary Conservation	0%	Voluntary	Yes	No
2	Water Alert	10%	Mandatory	Yes	Yes
3	Water Warning	25%	Mandatory	Yes	Yes
4	Water Emergency	35%	Mandatory	Yes	Yes
5	Water Crisis	50%	Mandatory	Yes	Yes

The City's current ordinance allows for declaration of water shortages by the City Manager upon recommendation of the Director of Public Works & Community Development. Upon such declaration, the City will provide notification to the local media, post the shortage stage and applicable ordinance requirements on its website and mail notices to its customers in its next regular billing cycle. Additional information on regional and statewide water shortage conditions will be provided through a link on the City's website to the DWR location for water supply information.

Normal conservation conditions (Stage 1) are in effect anytime when shortage or emergency conditions are not in effect. Shortage conditions (Stages 2 and 3) will be in effect when there is a shortage requiring up to a 25 percent reduction in water use, either city-wide or in a subarea or user category within the City. Emergency conditions (Stages 4 and 5) will be in effect when there is a shortage requiring over a 25 percent reduction in water use, either city-wide or in a subarea or user category within the City. The City's Public Works & Community Development Department monitors water supply and water use to determine whether a shortage or emergency condition is projected to occur and to estimate its anticipated magnitude.

Representatives from the City's Public Works & Community Development Department meet monthly as an advisory committee with representatives from SCWA and its member agencies to coordinate about water issues, including whether it is a dry year or wet year as defined by DWR, and potential impacts on water supplies. The representatives meet more frequently if conditions indicate the need to communicate more frequently than monthly, such as during water shortages or emergencies. If the total projected supplies available to the City from all its sources are anticipated to be less than that needed to meet demands, then the City Public Works & Community Development Department determines the percent shortage and takes actions to implement the appropriate shortage or emergency stage according to the procedures specified in the City's Emergency Water Conservation Ordinance.

Frequent monitoring is required during emergency water shortages to enable the City to effectively balance supply and demand. Water supply (production) is provided to meet demands. Therefore, if the City monitors its water production, it will be an indicator of the reduction in demands. The information on water production is more easily accessible in a more timely fashion than corresponding information on demands. Accordingly, monitoring activities will be based on the Stage of Action, as follows:

- During normal supply and Stage 1 conditions, Water Treatment Plant staff will prepare monthly reports of daily water production.
- During a Stage 2 or Stage 3 water shortage, Water Treatment Plant staff will prepare weekly reports of daily water production for review by the Assistant Director of Public Works/Utilities Manager. The Public Works Department will compare the weekly production to the target weekly production to determine if the reduction goal is being met. If not, the Assistant Director of Public Works & Community Development will notify the Director of Public Works & Community Development that corrective action is needed.

During a Stage 4 or Stage 5 water shortage, the procedures listed above for Stage 2 or Stage 3 will be followed on a daily, rather than weekly, basis.

Table 5-9 summarizes the water use prohibitions contained in the current emergency water conservation ordinance. It also shows recommended modifications identified by the City Task Force in 2005. Enforcement of the water use prohibitions would be conducted by Public Works maintenance staff while in the field (e.g., meter reading, repairing facilities, etc.).

Table 5-9. Water Use Prohibitions

Stage	Current Prohibitions	Proposed/Recommended Prohibitions
1 – Voluntary Conservation	• No runoff from treated water system to gutter, ditch or drain. • Failing to repair controllable leaks. • Washing sidewalks, driveways, parking areas, tennis courts, patios or other paved areas (except as part of curing concrete during construction).	• Modify current prohibition as shown in italics: "Allowing water to run off *unused* to a gutter, ditch or drain." • Add an exception for washing paved areas in case needed for health and safety reasons. • Add following prohibitions: ○ No use of hand-held hoses without automatic shut-off fixtures. ○ No irrigation during rain events. • Add following prohibitions for new development: ○ No single pass cooling connections. ○ Require recirculating systems for commercial car washes and commercial laundries. ○ Require recirculating systems for decorative fountains.
2 – Water Alert (10%)	All from Stage 1 plus the following: • No water from hydrants except for fire fighting and other health and safety purposes.	All from Stage 1 plus add the following: • Restrict lawn watering and landscape irrigation only when necessary and only between 6 pm and 9 am. • Vehicle washing only with bucket or hand-held hose with automatic shut-off nozzle, or at commercial car wash. • Restaurant water served only upon request. • Non-potable water used for construction purposes unless health and safety issue.
3 – Water Warning (25%)	All from Stages 1 and 2	All from Stages 1 and 2
4 – Water Emergency (35%)	All from Stages 1 through 3	All from Stages 1 through 3 plus add the following: • Limit landscape watering to specified days. • No landscape watering without using hand-held hose with automatic shut-off nozzle or micro-irrigation system. • Sprinkler systems can only be used for active public areas, e.g., park and school grounds.
5 – Water Crisis (50%)	All from Stages 1 through 4	All from Stages 1 through 4

5.6.4 Penalties for Excess Water Use

Beginning with Stage 2, penalties are applied on water use in excess of a baseline amount. The purpose of the penalty is to encourage customers to reduce use to or below baseline amounts. Table 5-10 shows the current baseline amounts specified in the 2003 ordinance, determined as the usage in the base year of 1989.

Table 5-10. Current Threshold Amounts for Water Use Penalties

Stage	Description	Residential	Commercial/Industrial	Landscape Irrigation (dedicated meter)
2	Water Alert	350 gallons per day (gpd)	>95% of 1989 base use	>75% of 1989 base use
3	Water Warning	320 gpd	>90% of 1989 base use	>75% of 1989 base use
4	Water Emergency	295 gpd	>85% of 1989 base use	>75% of 1989 base use
5	Water Crisis	230 gpd	>71% of 1989 base use	>50% of 1989 base use

The 2005 City Task Force provided input on the current baseline amounts. It was recommended that the ordinance be modified to have the City Manager select an appropriate base year if an emergency condition is invoked. Typically, water use during drier years is higher than during wetter years due to higher irrigation uses (assuming that no prohibitions are in place). Selecting a base year with low water use would have greater impacts on customers than selecting a base year with higher use.

DWR's SVI classifies water years (October 1 through September 30) into five types: wet, above normal, below normal, dry, and critically dry. The current ordinance is based on calendar year 1989 as the base year. The water year 1988 (October 1, 1988 through September 30, 1989) was a critically dry year; and water year 1989 (October 1, 1989 through September 30, 1990) was a dry year. This was a very dry period prior to imposition of prohibitions during the last major extended drought period. Therefore, water use during this base year would reflect the high end of the City's pre-drought usage. However, this base year is 22 years ago and the City's customers have changed over time, making it very difficult to compare with usage by current customers.

The City's treated water use in calendar year 2004 was the highest usage over the last 10 years, and reflects drier conditions. Water year 2003 (October 1, 2003 through September 30, 2004) was an above normal year; while water year 2004 (October 1, 2004 through September 30, 2005) was a below normal year.

The City's treated water use in calendar year 2000 was the lowest usage over the last 10 years, and reflects wetter conditions. Water year 1999 (October 1, 1999 through September 30, 2000) was a wet year; and water year 2000 (October 1, 2000 through September 30, 2001) was an above normal year.

Table 5-11 shows the recommended baseline amounts from the 2005 Task Force. The residential category shows a range of usage in gallons per person per day depending on the selected base year. The high end of the range is a 2004 base year; the low end is a 2000 base year. The City Manager would select the appropriate base year based on the recommendation of the Director of Public Works & Community Development.

Table 5-11. Recommended Baseline Amounts for Water Use Penalties

Stage	Residential	Commercial/Industrial	Landscape Irrigation (dedicated meter)
1-Voluntary	Voluntary Conservation	Voluntary Conservation	Voluntary Conservation
2-Water Alert (10%)	315 - 335 gpd (High end is 90% of 2004 base use; low end is 90% of 2000 base use. City Manager to select appropriate base year.)	>90% of base year use (City Manager to select base year.)	>75% of base year use (City Manager to select base year.)
3-Water Warning (25%)	265 - 280 gpd (Note: 75% of base use)	>85% of base year use	>70% of base year use
4-Water Emergency (35%)	230 - 245 gpd (Note: 65% of base use)	>70% of base year use	>60% of base year use
5-Water Crisis (50%)	175 - 190 gpd (Note: 50% of base use)	>50% of base year use	>50% of base year use

The current ordinance contains an exception process to allow customers to apply to the Public Works Director to increase their baseline amounts due to the following reasons:

- Medical requirements;
- More than four residents in a single-family residential household. The additional amount allotted shall be fifty gallons per day per person.

- Incorrect customer classification based on predominant use;
- When failure to do so would cause severe economic hardship to the applicant, including, but not limited to, threat of imminent insolvency; and
- When failure to do so would cause an emergency condition affecting the health, sanitation, fire protection, or safety of the applicant or the public.

Upon review of the written application, such exceptions may be granted that one or more condition has been satisfied and it is in the public interest to grant the exception. The quantity of additional water allowed by the exception to alleviate the condition is determined by the Director of Public Works & Community Development.

The 2005 Task Force recommended that the following changes be made to the current exception process:

- Add "Protect mature trees providing community benefit" as an acceptable condition to apply for an exception.

Table 5-12 summarizes the penalties for excess water use when the emergency conservation plan is in effect. Penalties are applied to water use above the baseline amounts, which are determined by the stage of action. For example, if the stage of action is Water Warning Level 3, and a residential household averaged 400 gpd over the billing period, 32 gpd of the excess would be charged at 2 times the regular rate, and the remaining 48 gpd of excess water use would be charged at 3 times the regular rate.

Table 5-12. Excess Water Use Penalties

Amount of Excess Water Use	Increased Rate for Use in Excess
<=10% higher than baseline for Stage of Action	2 times regular rate
10.01% to 20% higher than baseline for Stage of Action	3 times the regular rate
> 20% higher than the baseline for Stage of Action	4 times the regular rate

Enforcement of the ordinance stresses public education and a cooperative approach to encourage compliance. Additional enforcement options currently include the following in ascending order of severity:

- Written warnings
- Placement of flow restriction devices or reduction in service
- Termination of service

5.6.5 Revenue and Expenditure Impacts

The Act requires an analysis of impacts on a water supplier's revenues and expenditures from a water shortage that reduces water use. One concern is that reduced water consumption may result in reduced revenues. Another concern is that there may be higher costs to operate the system due to the shortage (e.g., if it is necessary to hire additional staff, purchase emergency short-term supplies at higher costs than normal supplies, make computer program modifications for billing, or increased public information costs).

The City ordinance (Section 13.35.095) provides for drought surcharges, which will act to mitigate the effect of revenue losses due to lower water consumption. Additionally, revenue from excess water use rates will also be used to offset increased costs due to ordinance implementation and enforcement.

A drought surcharge may be imposed by the City Council, upon recommendation by the Finance Director, to compensate for loss of water revenue or to pay an additional cost for the purchase of water by the City. The 2005 Task Force recommended that the current ordinance should be modified to remove the monthly surcharge amounts and duration of the surcharge. The specific amounts and duration should be determined when a drought surcharge is imposed.

During shortages, drought surcharge levels should be reviewed periodically to determine their adequacy to maintain the required revenues. To provide flexibility to handle a variety of conditions, the 2005 Task Force recommended that the ordinance be modified to allow the City Manager to modify the surcharge levels upon 30 days notice in order to provide for continued revenue sufficiency to maintain a safe and reliable water system. The City does not anticipate hiring additional staff during shortages, and the computer billing system is able to handle the drought surcharge program. The City already has an extensive public information program and would just re-focus the public messages as relevant for the emergency situation. In addition, the City has the ability to access emergency short-term supplies at costs consistent with its normal supply.

5.6.6 Emergency Preparedness

The water shortage contingency plan describes five stages of action for the City, from a 10 percent up to a 50 percent cutback in water use, as required by the UWMP Act. These stages of action assume that there may be reduced supplies from the City's normal sources, under conditions that may be months in duration.

The City should also be prepared for a catastrophic event that would result in complete loss of supply from its normal sources. It is likely that a complete loss of supply would be short-term, lasting from a day to a week or so, until some reduced supply is restored from normal sources. As part of its public education efforts, the City encourages individual preparedness and in-home storage of emergency water supply. The purpose of the in-home preparedness is to provide an immediately accessible supply for the first few days until some City supply was restored. Examples of such public information are available from ABAG, and from large water agencies in the Bay Area, such as the San Francisco Public Utilities Commission.

A catastrophic event, such as a major earthquake, would likely be a regional emergency. An emergency of the magnitude to cause complete loss of water supply would trigger the City's Disaster/Emergency Response Plan, and would involve regional coordination with other cities and the County to effectively address the emergency situation. A major disaster may also involve State and Federal agencies, as outlined in the Disaster/Emergency Response Plan.

The City has a comprehensive Disaster/Emergency Response Plan for the water and wastewater systems, as well as other City functions. This plan provides a broad-based framework that guides the overall City emergency response, of which water supply is one part. It includes operational provisions for handling water emergencies, including criteria for unsafe water alerts and boil water orders, emergency notification and operations procedures, transmission and distribution system checklists, and notification templates and procedures. The Disaster/Emergency Response Plan is updated periodically. Within the next five years, the plan will be revised to account for pipeline failures. The plan contains secure information and is therefore not available to the general public.

During catastrophic emergencies with complete loss of supply, only essential health and safety needs would be met. During such an event, businesses and households would not be operating as normal. For example, critical drinking water for sustaining life is estimated at 1 gallon per person per day by such

organizations as the American Red Cross, Federal Emergency Management Agency, and California Office of Emergency Services. The appropriate level of critical emergency water and the method of distributing the water to residents is defined as part of the Disaster/Emergency Response Plan.

Public education is a key component of handling water shortages. If the emergency is such that the Disaster/Emergency Response Plan has been invoked, the emergency communication procedures set out in that plan would take precedence. In emergencies, notification will be given to residents using any means available to communicate this information (e.g., door-to-door) if typical means of communication are not available.

Lake Herman is a key component of the City's emergency supply, in the event of loss of NBA and Solano Project supplies. The City manages and operates Lake Herman as an emergency water supply. This emergency water supply is available locally for treatment assuming that the Lake Herman Pump Station is operational. In fiscal year 2012-13, the City is planning to perform the Lake Herman Pump Station Improvements - Emergency Generator Transfer Switch project. This project involves the installation of a manual genset transfer switch to allow emergency power from a portable generator.

The lake has a storage capacity of 1,400 AF, which can provide a significant emergency supply on a short-term basis. For example, if Lake Herman were full, it could supply the City's current average day demand of about 10 million gallons per day for about 1.5 months with no demand reductions; and could provide supply for an even longer period with demand restrictions that would be in effect during a water shortage. The City should maintain the storage capacity of Lake Herman and continue to manage it for emergency supply.

The City could also consider investigating the feasibility of and implementing other potential emergency source options, such as:

- Vendor contract mechanisms that could be implemented quickly to provide emergency bottled water, emergency water trucks (bulk water), and emergency water system repairs.
- Backup interconnection with Vallejo – potential for a new pipeline from a new development in the hills adjacent to City (Hiddenbrook). This interconnection would allow the City to obtain treated water from Vallejo.
- Desalination of non-potable water (e.g., Carquinez Strait, brackish or non-potable groundwater) – package units are available for reverse osmosis treatment in sizes ranging from 0.5 to 2.0 mgd modules).

Section 6
Water Demand Management Measures

6.1 Law

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

10631 (f) Provide a description of the supplier's water demand management measures. This description shall include all of the following:

10631 (f) (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 prohibitions.

(N) Residential ultra-low-flush toilet replacement programs.

10631 (f) (2) A schedule of implementation for all water demand management measures proposed or described in the plan.

10631 (f) (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.

10631 (f) (4) An estimate, if available, of existing conservation savings on water use within the supplier's service area, and the effect of such savings on the supplier's ability to further reduce demand.

10631 (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, which offer lower incremental costs than expanded or additional water supplies. This evaluation shall do all of the following:

10631 (g) (1) Take into account economic and noneconomic factors, including environmental, social, health, customer impact, and technological factors.

10631 (g) (2) Include a cost-benefit analysis, identifying total benefits and total costs.

10631 (g) (3) Include a description of funding available to implement any planned water supply project that would provide water at a higher unit cost.

10631 (g) (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.

10631 (h) Urban water suppliers that are members of the California Urban Water Conservation Council and submit annual reports to the 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).

6.2 Overview of Implementation Status

This section discusses the City's execution of required water conservation measures. Potential new conservation measures are discussed in Section 3.5.

The City has continuously implemented a water conservation program since 1991. The City is a signatory to the MOU Regarding Urban Water Conservation in California through the CUWCC. The UWMP Act identifies 14 DMMs for urban water suppliers to address. DMMs are measures, programs, and incentives that prevent the waste of water and promote the reasonable and efficient use and reuse of available supplies. All urban water suppliers have the option of reporting on these measures. These measures are based on the original 16 BMPs established in the UWMP Act and the MOU. The City is only required to implement those measures that are found to be cost-effective (those with a benefit-cost ratio greater than 1). The measures that are not fully implemented are not cost effective. In some cases, the City has partially implemented some measures, even though they are not cost effective. Table 6-1 lists each of the DMMs and their current implementation status.

Appendix I-1 contains the BMP coverage reports received from the CUWCC for the 2009/2010 reporting period. Appendices I-2 and I-3 contain the City's 2009 and 2010 BMP reports, respectively.

At the time of the 2005 UWMP, the City applied for exemptions from implementing those measures that would not be cost-effective overall when total program benefits and costs are considered (i.e., those measures that have a benefit-cost ratio less than one). For the 2010 UWMP, the cost effectiveness analyses

conducted for the 2005 UWMP are still assumed. Appendix J provides the 2005 UWMP cost-effectiveness analyses of the DMMs that the City is not fully implementing, in support of the City's previous exemption request.

Table 6-1. Summary of Demand Management Measure Implementation

DMM #/BMP # - Name	Implementation Status
A/3.1 — Water Survey Programs for Single-Family Residential and Multi-Family Residential Customers	Partially implemented – not evaluated for fully implemented status
B/3.1 — Residential Plumbing Retrofits	Partially implemented – not evaluated for fully implemented status
C/1.2 — System Water Audits, Leak Detection, and Repair	Fully implemented
D/3 — Metering with Commodity Rates	Fully implemented
E/5 — Large Landscape Conservation Programs	Partially implemented – not evaluated for fully implemented status
F/3.3 – High-Efficiency Washing Machine Rebate Programs	Fully implemented
G/2.1 — Public Information Programs	Fully implemented
H/2.2 — School Education Programs	Fully implemented
I/4 — Conservation Programs for CII Accounts	Partially implemented – not evaluated for fully implemented status
J/1.1.3 — Wholesale Agency Programs	Not applicable
K/1.4 — Conservation Pricing	Fully implemented
L/1.1.1 — Water Conservation Coordinator	Fully implemented
M/1.1.2 — Waste Water Prohibition	Fully implemented
N/3.4 — Residential Ultra-Low-Flush Toilet Replacement Programs	Partially implemented – not evaluated for fully implemented status

6.3 Fully Implemented Measures

The City currently has fully implemented DMMs C, D, F, G, H, K, L, and M. The following sections describe the City's implementation of these DMMs.

6.3.1 System Water Audits, Leak Detection and Repair (DMM C)

This measure requires water suppliers to conduct audits of the water system consistent with American Water Works Association guidelines if unaccounted-for water exceeds 10 percent. Prior to the 2001 UWMP, unaccounted for water in the City averaged over 10 percent historically. Since that time, the City has instituted a service line replacement program to replace failing plastic service lines. The City also has a water line replacement program aimed at replacing undersized and aging infrastructure. Due to these programs, the City's unaccounted-for water losses were reduced; therefore, the City is not required to conduct audits.

6.3.2 Metering with Commodity Rates (DMM D)

The City has been fully metered since 1962. Customer billing is based on volume of use. The City's current rate structure is an increasing block rate design.

6.3.3 High-Efficiency Washing Machine Rebate Programs (DMM F)

This measure calls on water suppliers to offer cost-effective rebates to their customers for the purchase of high-efficiency washing (HEW) machines. SCWA has implemented a HEW machine rebate of $125 per unit for its service area including the City of Benicia. Since its inception in 2007, a total of 742 rebates for HEW machines in the City have been provided (90 in 2007; 220 in 2008; 387 in 2009; and 45 in 2010). Financial planning for the program is conducted by SCWA and the City reimburses SCWA for a cost share of the program cost.

6.3.4 Public Information Programs (DMM G)

The City maintains an active public information program. This program addresses water supply, water quality, and water use efficiency issues. Information outreach includes conservation information and web links on the City's Public Works Department web site, periodic bill inserts addressing water use efficiency, distribution of conservation pamphlets and irrigation booklets, and distribution of conservation information at community events. The City's website has a link to water conservation information where people can find water conservation tips and rebate information. The website also has six water-related Public Service Announcements, one of which is titled, "Sweep! Don't Hose," which encourages people to use a broom rather than a water hose to clean their pavement and use a nozzle when washing the car.

During periods of reduced surface water deliveries, the City increases public outreach and dissemination of conservation information. In 2009, the City attended and participated in 12 community events to promote water conservation, provided brochures and plumbing handbooks on water saving suggestions to the public, and disseminated water saving devices such as low-flow showerheads (175) and hose nozzles (over 230). In 2010, the City attended and participated in 9 community events, providing 150 low-flow showerheads and over 350 hose nozzles, along with additional moisture meters and guides to smart water use. The City also publicizes examples of drought-tolerant landscaping through programs with the California Native Plant Society, such as exhibits at Earth Day and City Hall.

6.3.5 School Education Programs (DMM H)

The City offers a Water Education Program for grades K-6. This program includes classroom presentations; field trips to the City's water and wastewater treatment plants, local reservoir, and wetlands; and public library displays. Topics covered by the program include water conservation, pollution prevention, and water quality. In 2009, the program conducted 45 classroom presentations to 1,215 students and 49 presentations to 1,267 students in 2010. Also, SCWA sponsored Zun Zun water conservation assemblies for schools. In 2010, 4 shows were held for 900 elementary school students in Benicia.

6.3.6 Conservation Pricing (DMM K)

Volumetric charges are based on measured use and follow an increasing block schedule for all classes of service. Rates for wastewater service are volumetric for commercial and industrial customer classes according to an increasing block schedule, and are non-volumetric flat rates for residential sewer customers. Overall, the City's rate structure meets the DMM requirements.

6.3.7 Water Conservation Coordinator (DMM L)

The City has a designated water conservation coordinator. The water conservation coordinator is responsible for developing and implementing the City's conservation programs and initiatives.

6.3.8 Water Waste Prohibition (DMM M)

The City has an ordinance for emergency water conservation planning that incorporates water waste prohibitions consistent with implementation of DMM M. These prohibitions include: not allowing treated water runoff to gutters, ditches, and drains; failure to repair controllable leaks; and not washing sidewalks, driveways, parking lots, tennis courts, patios, or other paved areas unless the concrete foundation is in the process of curing during construction and except to alleviate immediate fire hazards.

The current ordinance does not specifically prohibit single pass cooling systems in new connections, or non-recirculating systems in new car washes and laundry systems. However, the current ordinance specifies maximum residential and non-residential water use by shortage stage that effectively eliminates non-essential uses.

6.4 Partially Implemented Measures

The City has partially implemented DMMs A, B, E, I, and N. Although they are not cost effective per the 2005 UWMP cost benefit analysis (see Appendix J), the City is pursuing these and other DMMs to reduce demands to levels that would demonstrate compliance with the 2009 Water Conservation Bill requiring a 20 percent reduction in statewide per capita demand by 2020. The following sections describe current and potential for enhanced implementation of these DMMs.

6.4.1 Water Survey Programs for Single-Family Residential and Multi-Family Residential Customers (DMM A)

This measure involves offering water conservation surveys to not less than 20 percent of single- and multi-family residential customers every two years, and completing surveys for not less than 15 percent of single- and multi-family residential customers within 10 years of program initiation. The City would need to complete more than 100 single-family surveys and over 50 multi-family surveys annually over the next 10 years.

These water audits are essentially one-on-one public education efforts. Other agencies have found that the savings from water audits, whether residential or commercial, typically last for about a 3-year period, and then must be repeated due to owner/staff turnover. Instead of these individual audit efforts, the City has focused on group public education efforts.

SCWA instituted a residential audit program in 2009. These audits include indoor and outdoor water use analysis. The program is direct marketed by mailings to the top 20 percent of single family residential water users. Since its inception in 2009, a total of 280 audits for single-family residential customers have been performed in the City (138 in 2009 and 142 in 2010). Financial planning for the program is conducted by SCWA and the City of Benicia reimburses SCWA for a cost share of the program cost.

Additionally, the City has contracted with Ennovationz to provide free home water (and energy) assessments to approximately 250 Benicia homes. Funding is provided from the Valero/Good Neighbor Steering Committee Settlement Agreement. The program started in February 2010 and as of March 2011, 129 water assessments have been completed. These assessments are in addition to the SCWA residential audit program.

6.4.2 Residential Plumbing Retrofits (DMM B)

The purpose of this measure is to make available low-flow showerheads, aerators, toilet displacement devices, and other water savings fixtures or devices to single- and multi-family residences constructed prior to 1992 when building standards were modified to require water saving fixtures in new construction.

This measure would require that the City distribute these devices to not less than 10 percent of their single- and multi-family customers every two years until such time the City can demonstrate that at least 75 percent of residences constructed prior to 1992 have been retrofitted.

City analyses have indicated the cost to fully implement this program is much higher than the value of water savings. However, the City has periodically distributed free kits; first in 1991 during the last major drought, and periodically since then when kits are available. Over time, it is anticipated that replacement with low water use fixtures will occur naturally as a result of normal maintenance and remodeling projects. In addition, SCWA is offering free water savings hardware to residents that have a water audit (DMM A) conducted.

In January 2011, the City's CSC approved the implementation of a program to provide low-flow showerheads and soil moisture detectors at no cost to the public. The products are designed to reduce interior residential water use and residential landscape irrigation, respectively. The CSC approved a program with limited funding at this time, but will revisit the concept of providing a wider coupon or rebate program in the future after the initial stock of water savings devices is distributed.

6.4.3 Large Landscape Conservation Programs (DMM E)

This measure consists of two parts. The first part requires developing evapotranspiration (ET)-based water budgets for accounts with dedicated irrigation meters. The City currently has 282 irrigation meters. The second part involves providing large landscape surveys to not less than 15 percent of commercial, industrial, and institutional accounts with mixed-use meters within 10 years of program initiation. For the 605 commercial/institutional and industrial meters in 2010, the City would need to provide approximately 9 large landscape water surveys per year.

On September 10, 2009, the State of California released an update to its MWELO as a standard for implementation in communities without landscape ordinances concerning water use. The ordinance provides water conservation requirements for most new development and redevelopment projects and retrofit requirements for existing large landscape properties with an area of one acre or greater and cemeteries. Requirements for existing large landscape properties include, but are not limited to, irrigation water use analyses, irrigation surveys, and irrigation audits to evaluate water use and provide recommendations as necessary to reduce landscape water use to a level that does not exceed the Maximum Applied Water Allowance (MAWA) for existing landscapes. The MAWA is a function of ET rates for the area.

SCWA established the Solano Smart Irrigation Rebate Program to provide monetary incentives for installing efficient irrigation systems. This program is effective from July 1, 2009 to June 30, 2011, and provides a 50 percent cost rebate for purchase of the Smart Irrigation Controller. Rebates are up to $300 for 4-12 stations, $700 for 13-24 stations, and $1,000 for 25 or more stations. Part of the rebate program includes a free landscape water survey from SCWA.

In addition, the City has retrofitted irrigation systems at two parks since 2005 involving installation of an ET-controlled irrigation system.

6.4.4 Conservation Programs for Commercial, Industrial, and Institutional Accounts (DMM I)

This measure requires water suppliers to provide facility water audits to not less than 10 percent of their commercial, industrial, and institutional customers within 10 years of program initiation. These water audits are essentially one-on-one public education efforts. Other agencies have found that the savings from water audits, whether commercial or residential, typically last for about a three-year period, and then must

be repeated due to owner/staff turnover. Instead of these individual audit efforts, the City has focused on group public education efforts.

To meet the CUWCC guideline for audits on 10 percent of CII customers, the City would need to complete approximately six audits annually for 10 years. Since 2007, 18 CII audits have been conducted by SCWA within the City (13 in 2007; 4 in 2008; 0 in 2009 and 4 in 2010).

6.4.5 Residential Ultra-Low-Flush Toilet (ULFT) Replacement Programs (DMM N)

This measure requires water suppliers to implement a ULFT distribution program that is at least as effective as requiring retrofit of existing residential high-flow toilets with toilets rated 1.6 gallons per flush (gpf) or less upon property resale. Alternatively, suppliers can offer a toilet rebate to customers of at least $100.

SCWA has implemented a high-efficiently toilet (HET) rebate of $125 per unit for its service area including the City. HETs use only 1.28 gpf. Since its inception in 2007, a total of 241 rebates for HETs in the City have been provided (13 in 2007; 54 in 2008; 75 in 2009; and 99 in 2010). Financial planning for the program is conducted by SCWA and the City reimburses SCWA for a cost share of the program cost.

Appendix A

Ahwanhee Water Principles for
Resource Efficient Land Use

The Ahwahnee Water Principles for Resource Efficient Land Use

Preamble

Cities and counties are facing major challenges with water contamination, storm water runoff, flood damage liability, and concerns about whether there will be enough reliable water for current residents as well as for new development. These issues impact city and county budgets and taxpayers. Fortunately there are a number of stewardship actions that cities and counties can take that reduce costs and improve the reliability and quality of our water resources.

The Water Principles below complement the Ahwahnee Principles for Resource-Efficient Communities that were developed in 1991. Many cities and counties are already using them to improve the vitality and prosperity of their communities.

Community Principles

1. Community design should be compact, mixed use, walkable and transit-oriented so that automobile-generated urban runoff pollutants are minimized and the open lands that absorb water are preserved to the maximum extent possible.
2. Natural resources such as wetlands, flood plains, recharge zones, riparian areas, open space, and native habitats should be identified, preserved and restored as valued assets for flood protection, water quality improvement, groundwater recharge, habitat, and overall long-term water resource sustainability.
3. Water holding areas such as creek beds, recessed athletic fields, ponds, cisterns, and other features that serve to recharge groundwater, reduce runoff, improve water quality and decrease flooding should be incorporated into the urban landscape.
4. All aspects of landscaping from the selection of plants to soil preparation and the installation of irrigation systems should be designed to reduce water demand, retain runoff, decrease flooding, and recharge groundwater.
5. Permeable surfaces should be used for hardscape. Impervious surfaces such as driveways, streets, and parking lots should be minimized so that land is available to absorb storm water, reduce polluted urban runoff, recharge groundwater and reduce flooding.
6. Dual plumbing that allows grey water from showers, sinks and washers to be reused for landscape irrigation should be included in the infrastructure of new development.
7. Community design should maximize the use of recycled water for appropriate applications including outdoor irrigation, toilet flushing, and commercial and industrial processes. Purple pipe should be installed in all new construction and remodeled buildings in anticipation of the future availability of recycled water.
8. Urban water conservation technologies such as low-flow toilets, efficient clothes washers, and more efficient water-using industrial equipment should be incorporated in all new construction and retrofitted in remodeled buildings.
9. Ground water treatment and brackish water desalination should be pursued when necessary to maximize locally available, drought-proof water supplies.

Implementation Principles

1. Water supply agencies should be consulted early in the land use decision-making process regarding technology, demographics and growth projections.
2. City and county officials, the watershed council, LAFCO, special districts and other stakeholders sharing watersheds should collaborate to take advantage of the benefits and synergies of water resource planning at a watershed level.
3. The best, multi-benefit and integrated strategies and projects should be identified and implemented before less integrated proposals, unless urgency demands otherwise.
4. From start to finish, projects and programs should involve the public, build relationships, and increase the sharing of and access to information. The participatory process should focus on ensuring that all residents have access to clean, reliable and affordable water for drinking and recreation.
5. Plans, programs, projects and policies should be monitored and evaluated to determine if the expected results are achieved and to improve future practices.

Authors: Celeste Cantu, Martha Davis, Jennifer Hosterman, Susan Lien Longville, Jonas Minton, Mary Nichols, Virginia Porter, Al Wanger, Robert Wilkinson, Kevin Wolf

Editor: Judy Corbett

Source: *Local Government Commission website*

Appendix B
Public Involvement Materials

B-1 Notices of UWMP Preparation

CITY HALL • 250 EAST L STREET • BENICIA, CA 94510 • (707) 746-4200 • FAX (707) 747-8120

THE CITY OF BENICIA CALIFORNIA

Public Works & Community Development Department

March 16, 2011

Mr. David Okita, General Manager
Solano County Water Agency
P.O. Box 349
Elmira, CA 95625

Subject: City of Benicia Urban Water Management Plan Update

Dear Mr. Okita:

The Urban Water Management Plan Act (Water Code Section 10610-10656) requires the City of Benicia to update and adopt its Urban Water Management Plan by July 1, 2011. We are reviewing our current Plan, which was last updated in 2005, and will be considering revisions to it. We invite your agency's participation in this process.

We will make any proposed revisions to our plan available for public review and will hold a public hearing on the revised plan later this year. You will be given notice of the City's meeting in which the Urban Water Management Plan will be considered.

Should you have any questions about our Plan, or the process for updating it, please call me at (707) 746-4236.

Sincerely,

Carrie Wenslawski

Carrie Wenslawski
Management Analyst

ELIZABETH PATTERSON, *Mayor*
Members of the City Council
ALAN M. SCHWARTZMAN, *Vice Mayor* . TOM CAMPBELL . MARK C. HUGHES . MIKE IOAKIMEDES

BRAD KILGER, *City Manager*
TERI DAVENA, *City Treasurer*
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Public Works & Community Development Department

March 16, 2011

Mr. David Mansfield, General Manager
Solano Irrigation District
810 Vaca Valley Parkway, Suite 201
Vacaville, CA 95688

Subject: City of Benicia Urban Water Management Plan Update

Dear Mr. Mansfield:

The Urban Water Management Plan Act (Water Code Section 10610-10656) requires the City of Benicia to update and adopt its Urban Water Management Plan by July 1, 2011. We are reviewing our current Plan, which was last updated in 2005, and will be considering revisions to it. We invite your agency's participation in this process.

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Public Works & Community Development Department

March 16, 2011

Ms. Martha Jensen, Management Analyst
Department of Public Works
City of Dixon
600 East A Street
Dixon, CA 95620

Subject: City of Benicia Urban Water Management Plan Update

Dear Ms. Jensen:

The Urban Water Management Plan Act (Water Code Section 10610-10656) requires the City of Benicia to update and adopt its Urban Water Management Plan by July 1, 2011. We are reviewing our current Plan, which was last updated in 2005, and will be considering revisions to it. We invite your agency's participation in this process.

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Public Works & Community Development Department

March 16, 2011

Mr. George Hicks, Director
Department of Public Works
City of Fairfield
1000 Webster Street
Fairfield, CA 94533

Subject: City of Benicia Urban Water Management Plan Update

Dear Mr. Hicks:

The Urban Water Management Plan Act (Water Code Section 10610-10656) requires the City of Benicia to update and adopt its Urban Water Management Plan by July 1, 2011. We are reviewing our current Plan, which was last updated in 2005, and will be considering revisions to it. We invite your agency's participation in this process.

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Public Works & Community Development Department

March 16, 2011

Mr. Morris Barr, Interim
Director of Public Works
City of Rio Vista
One Main Street, P.O. Box 745
Rio Vista, CA 94571

Subject: City of Benicia Urban Water Management Plan Update

Dear Mr. Barr:

The Urban Water Management Plan Act (Water Code Section 10610-10656) requires the City of Benicia to update and adopt its Urban Water Management Plan by July 1, 2011. We are reviewing our current Plan, which was last updated in 2005, and will be considering revisions to it. We invite your agency's participation in this process.

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Public Works & Community Development Department

March 16, 2011

Mr. Daniel Kasperson, Director
Department of Public Works
City of Suisun City
701 Civic Center Boulevard
Suisun City, CA 94585

Subject: City of Benicia Urban Water Management Plan Update

Dear Mr. Kasperson:

The Urban Water Management Plan Act (Water Code Section 10610-10656) requires the City of Benicia to update and adopt its Urban Water Management Plan by July 1, 2011. We are reviewing our current Plan, which was last updated in 2005, and will be considering revisions to it. We invite your agency's participation in this process.

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Public Works & Community Development Department

March 16, 2011

Mr. Rod Moresco, Director
Department of Public Works
City of Vacaville
650 Merchant Street
Vacaville, CA 95688

Subject: City of Benicia Urban Water Management Plan Update

Dear Mr. Moresco:

The Urban Water Management Plan Act (Water Code Section 10610-10656) requires the City of Benicia to update and adopt its Urban Water Management Plan by July 1, 2011. We are reviewing our current Plan, which was last updated in 2005, and will be considering revisions to it. We invite your agency's participation in this process.

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THE CITY OF BENICIA CALIFORNIA

Public Works & Community Development Department

March 16, 2011

Mr. Erik Nugteren
Deputy Water Superintendent
City of Vallejo
202 Fleming Hill Road
Vallejo, CA 94589

Subject: City of Benicia Urban Water Management Plan Update

Dear Mr. Nugteren:

The Urban Water Management Plan Act (Water Code Section 10610-10656) requires the City of Benicia to update and adopt its Urban Water Management Plan by July 1, 2011. We are reviewing our current Plan, which was last updated in 2005, and will be considering revisions to it. We invite your agency's participation in this process.

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Public Works & Community Development Department

March 16, 2011

Mr. Don Holdener, Manager
Maine Prairie Water District
P.O. Box 73
Dixon, CA 95620

Subject: City of Benicia Urban Water Management Plan Update

Dear Mr. Holdener:

The Urban Water Management Plan Act (Water Code Section 10610-10656) requires the City of Benicia to update and adopt its Urban Water Management Plan by July 1, 2011. We are reviewing our current Plan, which was last updated in 2005, and will be considering revisions to it. We invite your agency's participation in this process.

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Public Works & Community Development Department

March 16, 2011

Mr. Mike Hardesty, General Manager
Reclamation District 2068
7178 Yolano Road
Dixon, CA 95620-9621

Subject: City of Benicia Urban Water Management Plan Update

Dear Mr. Hardesty:

The Urban Water Management Plan Act (Water Code Section 10610-10656) requires the City of Benicia to update and adopt its Urban Water Management Plan by July 1, 2011. We are reviewing our current Plan, which was last updated in 2005, and will be considering revisions to it. We invite your agency's participation in this process.

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Public Works & Community Development Department

March 16, 2011

Mr. Bill Emlen, Director
County of Solano
Department of Resource Management
675 Texas Street, Suite 5500
Fairfield, CA 94533

Subject: City of Benicia Urban Water Management Plan Update

Dear Mr. Emlen:

The Urban Water Management Plan Act (Water Code Section 10610-10656) requires the City of Benicia to update and adopt its Urban Water Management Plan by July 1, 2011. We are reviewing our current Plan, which was last updated in 2005, and will be considering revisions to it. We invite your agency's participation in this process.

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B-2 Notice of Public Hearing

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BENICIA CITY COUNCIL
NOTICE OF PUBLIC HEARING

NOTICE IS HEREBY GIVEN that a **PUBLIC HEARING** will be held Tuesday, May 17, 2011 at 7:00 p.m., in the City Council Chambers, 250 East L Street, on the following:

CONDUCT A PUBLIC HEARING TO RECEIVE ORAL COMMENTS OR WRITTEN STATEMENTS CONCERNING THE 2010 UPDATE TO THE CITY'S URBAN WATER MANAGEMENT PLAN

REVIEW PROCESS: A copy of this draft report is currently available for public review at the City Clerk's Office and the Public Works & Community Development Department, 250 East L Street, Benicia, Monday through Friday (except legal holidays) between the hours of 8:30 a.m. to noon and 1:00 p.m. to 5:00 p.m. The meeting agenda and packet materials are also available at the Benicia Public Library several days before the meeting date, as well as on the City's website at www.ci.benicia.ca.us/announcements.

Any written comments should be submitted prior to the public hearing to:

Public Works & Community Development Director
250 East L Street
Benicia, CA 94510
(707) 746-4240

Pursuant to Government Code Section 65009:

If you challenge a decision of the City Council in court, you may be limited to raising only those issues you or someone else raised at the Public Hearing described in this notice, or in written correspondence delivered to the City of Benicia at, or prior to, the Public Hearing. You may also be limited by the ninety (90) day statute of limitations in which to file and serve a petition for administrative writ of mandate challenging any final City decisions regarding planning or zoning.

BY ORDER OF THE COUNCIL:

Lisa Wolfe, City Clerk

ELIZABETH PATTERSON, *Mayor*
Members of the City Council
ALAN M. SCHWARTZMAN, *Vice Mayor* . TOM CAMPBELL . MARK C. HUGHES . MIKE IOAKIMEDES

BRAD KILGER, *City Manager*
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LISA WOLFE, *City Clerk*

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B-3 Public Hearing Agenda

BENICIA CITY COUNCIL
REGULAR MEETING AGENDA

City Council Chambers
May 17, 2011
7:00 PM

Times set forth for the agenda items are estimates.
Items may be heard before or after the times designated.

I. CALL TO ORDER (7:00 PM):

II. CLOSED SESSION:

III. CONVENE OPEN SESSION:

A. ROLL CALL.

B. PLEDGE OF ALLEGIANCE.

C. REFERENCE TO THE FUNDAMENTAL RIGHTS OF PUBLIC.

A plaque stating the fundamental rights of each member of the public is posted at the entrance to this meeting room per section 4.04.030 of the City of Benicia's Open Government Ordinance.

IV. ANNOUNCEMENTS/APPOINTMENTS/PROCLAMATIONS/PRESENTATIONS:

A. ANNOUNCEMENTS.

1. Announcement of action taken at Closed Session, if any.

2. Openings on Boards and Commissions:

Soltrans Public Advisory Committee:
Three Full Terms
Open until Filled

Sky Valley Open Space Committee:
One full term to January 31, 2015
Open until filled

Civil Service Commission:
One full term to January 31, 2015
Open until filled

Building Board of Appeals:
Three full terms to January 31, 2015
Open until filled

Solano Transportation Authority Pedestrian Advisory Committee:
One full term to January 31, 2014
Open until filled

3. **Mayor's Office Hours:**
Mayor Patterson will maintain an open office every Monday (except holidays) in the Mayor's Office of City Hall from 6:00 p.m. to 7:00 p.m. No appointment is necessary. Other meeting times may be scheduled through the City Hall office at 746-4200.

4. **Benicia Arsenal Update:**

B. APPOINTMENTS.

1. **Appointment of John Johnsen to the Economic Development Board for a full term to January 31, 2015.**

2. **Appointment of Anthony Shannon to the Community Sustainability Commission for a full term to January 31, 2015.**

C. PROCLAMATIONS.

1. **In recognition of National Safe Boating Week**

2. **In Recognition of Drowning Prevention Month**

3. **In Recognition of May as Older American's Month**

D. PRESENTATIONS.

V. ADOPTION OF AGENDA:

VI. OPPORTUNITY FOR PUBLIC COMMENT:

This portion of the meeting is reserved for persons wishing to address the Council on any matter not on the agenda that is within the subject matter jurisdiction of the City Council. State law prohibits the City Council from responding to or acting upon matters not listed on the agenda. Each speaker has a maximum of five minutes for public comment. If others have already expressed your position, you may simply indicate that you agree with a previous speaker. If appropriate, a spokesperson may present the views of your entire group. Speakers may not make personal attacks on council members, staff or members of the public, or make comments

which are slanderous or which may invade an individual's personal privacy.

A. WRITTEN COMMENT.

B. PUBLIC COMMENT.

VII. CONSENT CALENDAR (7: 30 PM):

Items listed on the Consent Calendar are considered routine and will be enacted, approved or adopted by one motion unless a request for removal or explanation is received from a Council Member, staff or member of the public. Items removed from the Consent Calendar shall be considered immediately following the adoption of the Consent Calendar.

A. Approval of Minutes of the Special and Regular Meeting of April 19, 2011, the Special Meeting of April 26, 2011 and the Special Meeting of May 3, 2011. (City Clerk).

B. SECOND READING OF AN ORDINANCE AMENDING THE BENICIA MUNICIPAL CODE TO REMOVE LISTING OF SIGN PERMIT FEES IN SECTION 18.08.030 - CITYWIDE. (Public Works and Community Development Director)

At present Benicia Municipal Code (BMC) Section 18.08.030 of the City's Sign Ordinance lists specific fee amounts for sign permits. Staff recommends the list of fees be removed and instead refer to the Master Fee Schedule to determine the costs associated with processing sign permits. No fee increases are being proposed. In addition, the fee for a sign permit variance was inadvertently omitted from the Master Fee Schedule. Staff recommends a fee of $150.00 for a sign permit variance be included when the Master Fee Schedule is updated.

Recommendation: Adopt a text amendment to Benicia Municipal Code Section 18.08.030 that removes reference to specific fee amounts for sign permits and add the fee for a sign permit variance at $150.00 to the Master Fee Schedule, when it is updated.

C. REVIEW AND ACCEPTANCE OF THE INVESTMENT REPORT FOR THE QUARTER ENDED DECEMBER 2010. (Finance Director)

The investment portfolio is in compliance with the City's Investment Policy and California Law. Additionally, the City has adequate investments to meet its expenditure needs for the next six months. The Finance Committee has reviewed these reports and recommends acceptance.

Recommendation: Accept, by motion, the investment report for the quarter ended December 2010.

D. RECOMMENDED AMENDMENTS TO MUNICIPAL CODE SECTION 1.42.110 (CANDIDATE DEBATE) REGARDING THE DATE AND PURPOSE OF THE FORUM. (City Attorney)

Section 1.42.110 of the Municipal Code establishes a candidate debate for all city council and mayoral candidates before the general election. The open government commission sponsors this debate. The proposed ordinance amends Section 1.42.110 to provide the commission flexibility in scheduling to prevent conflicts with other events in or of interest to the Benicia citizenry. The amendments also specify what types of questions will be asked at the event and renames it to a forum. The Open Government Commission has reviewed the proposed amendment and recommends the Council approve it.

Recommendation: Introduce the proposed ordinance amending Municipal Code Section 1.42.110.

E. APPROVAL OF PROP 1B GRANT SUBMISSION FOR THE PURCHASE OF AN ADMINISTRATIVE STAFF CAR FOR THE BENICIA BREEZE. (Finance Director)

The Benicia Breeze administrative vehicle requires replacement due to age, mileage and condition. The vehicle is eight years old and is on the Asset Replacement List. Sufficient funds to purchase this replacement vehicle are available in the Proposition 1B funds allocated to the City of Benicia for capital transit projects.

Recommendation: 1. Adopt the Resolution approving the execution of the Proposition 1B Public Transportation Modernization, Improvement, and Service Enhancement Account (PTMISEA) Certifications and Assurances as required for receiving PTMISEA grant funds; and
2. Authorize the City Manager or his designee to execute the document and any other actions necessary for obtaining financial assistance from PTMISEA funding.

F. Approval to waive the reading of all ordinances introduced and adopted pursuant to this agenda.

VIII. BUSINESS ITEMS (7:40 PM):

A public hearing should not exceed one hour in length. To maximize public participation, the council requests that speakers be concise and avoid repetition of the remarks of prior speakers. Instead, please simply state whether you agree with prior speakers.

A. CITY OF BENICIA URBAN WATER MANAGEMENT PLAN - 2010 UPDATE. (Public Works and Community Development Director)

The State Urban Water Management Planning Act (Act) requires water suppliers to update their plans at least every five years and to submit them to the Department of Water Resources. An Urban Water Management Plan (UWMP) serves as a long-range planning document for water supply and demand management measures, is a key component to integrated regional water management plans, and is an important source and interdependent document for cities and counties in the preparation and implementation of

their general plans. A key finding of the UWMP is that the City has a sufficient water supply. The City has more than enough water to meet the demands of customers under all conditions; normal year, single dry year, and multiple dry years. Only a public hearing is required at this meeting. The UWMP will be brought back for adoption at the Council's June 21st meeting.

RECOMMENDATION: Conduct a public hearing to receive public comment on the 2010 update to the City's Urban Water Management Plan.

B. ACCEPTANCE OF REPORT ON CURRENT STATUS OF IT PANOCHE FACILITY. (PUBLIC WORKS AND COMMUNITY DEVELOPMENT DIRECTOR)

Post-closure site control, remediation, and monitoring systems at the IT Panoche hazardous waste facility are currently functioning well. Efforts to secure long-term funding for facility maintenance are continuing.

RECOMMENDATION: Accept the report describing the current status of the IT Panoche hazardous waste facility.

C. CONSIDERATION OF REVENUE AND EXPENDITURE CHANGES, FISCAL POLICY CHANGES AND THE IMPACT ON THE FY 2010-11 MUNICIPAL BUDGETS. (Finance Director)

The City Council recently approved extensive changes to the Municipal Budgets, including the recognition on March 15, 2011 of $924,920 in General Fund revenue losses and revisions to the Fund Balance Reserve Policy on April 19, 2011. Since that time, the City Manager has identified additional net revenue losses of ($231,680), along with net expenditure savings of $119,945, leading to a General Fund Operating Deficit of ($424,730) in FY 2010-11 and Undesignated Reserves of $6.1 million. Due to revisions to the Fund Balance Reserve Policy, the Undesignated Reserves need to be reduced by ($2,405,315) in Accounts Receivable from the Valero/Good Neighbor Steering Committee (V/GNSC) Agreement that are due in trailing fiscal periods, leaving a balance of $3.7 million, which represents 12.1% of Operating Revenues. The Undesignated Reserves will return to the 20% level within the next two-year budget cycle, following receipt of $2 million from the V/GNSC funds, $1 million in December 2011 and $1 million in December 2012.

RECOMMENDATION: Adopt the Resolution approving Municipal Budget Adjustments for Fiscal Year 2010-11 and establishing a plan for replenishing the 20% Undesignated Reserve.

D. 2011-13 STRATEGIC PLAN UPDATE. (City Manager)

At the April 26th Council study session, staff reviewed proposed updates of the Strategic Plan with Council, including comments and suggestions from members of the various City Boards and Commissions. The additional

modifications made at that study session have been incorporated into the Plan document for Council's review and approval on May 17th.

RECOMMENDATION: Review and approve the 2011-13 Strategic Plan Update.

E. Council Member Committee Reports
(Council Member serve on various internal and external committees on behalf of the City. Current agendas, minutes and meeting schedules, as available, from these various committees are included in the agenda packet. Oral reports by the Council Members are made only by exception.)

1. **Mayor's Committee Meeting.**
   (Mayor Patterson)
   Next Meeting Date: May 18, 2011

2. **Association of Bay Area Governments (ABAG).**
   (Mayor Patterson and Council Member Ioakimedes)
   Next Meeting Date: October 13, 2011

3. **Finance, Audit and Budget Committee.**
   (Vice Mayor Schwartzman and Council Member Campbell)
   Next Meeting Date: May 27, 2011

4. **League of California Cities.**
   (Mayor Patterson and Vice Mayor Schwartzman)
   Next Meeting Date: July 28, 2011

5. **School Liaison Committee.**
   (Council Members Ioakimedes and Hughes)
   Next Meeting Date: June 23, 2011

6. **Sky Valley Open Space Committee.**
   (Council Members Campbell and Hughes)
   Next Meeting Date: August 3, 2011

7. **Solano EDC Board of Directors.**
   (Mayor Patterson and Council Member Campbell)
   Next Meeting Date: May 26, 2011

8. **Solano Transportation Authority (STA).**
   (Mayor Patterson and Council Member Ioakimedes)
   Next Meeting Date: June 8, 2011

9. **Solano Water Authority-Solano County Water Agency and Delta Committee.**
   Mayor Patterson and Vice Mayor Schwartzman)
   Next Meeting Date: May 12, 2011

10. **Traffic, Pedestrian and Bicycle Safety Committee.**
(Council Members Hughes and Ioakimedes)
Next Meeting Date: TBD

11. **Tri-City and County Regional Parks and Open Space.**
(Council Members Campbell and Hughes)
Next Meeting Date: June 13, 2011

12. **Valero Community Advisory Panel (CAP).**
(Council Member Hughes)
Next Meeting Date: TBD

13. **Youth Action Coalition.**
(Vice Mayor Schwartzman and Council Member Campbell)
Next Meeting Date: May 25, 2011

14. **ABAG-CAL FED Task Force-Bay Area Water Forum.**
(Mayor Patterson)
Next Meeting Date: June 27, 2011

15. **SOLTRANS Joint Powers Authority**
(Mayor Patterson, Council Member Ioakimedes)
Next Meeting Date: TBD

IX. ADJOURNMENT (10:00 PM):

Public Participation

The Benicia City Council welcomes public participation.

Pursuant to the Brown Act, each public agency must provide the public with an opportunity to speak on any matter within the subject matter jurisdiction of the agency and which is not on the agency's agenda for that meeting. The City Council allows speakers to speak on non-agendized matters under public comment, and on agendized items at the time the agenda item is addressed at the meeting. Comments are limited to no more than five minutes per speaker. By law, no action may be taken on any item raised during the public comment period although informational answers to questions may be given and matters may be referred to staff for placement on a future agenda of the City Council.

Should you have material you wish to enter into the record, please submit it to the City Manager.

Disabled Access

In compliance with the Americans with Disabilities Act (ADA), if you need special assistance to participate in this meeting, please contact Anne Cardwell, the ADA Coordinator, at (707) 746-4211. Notification 48 hours prior to the meeting will enable the City to make reasonable arrangements to ensure accessibility to this meeting.

Meeting Procedures

All items listed on this agenda are for Council discussion and/or action. In accordance with the Brown Act, each item is listed and includes, where appropriate, further description of the item and/or a recommended action. The posting of a recommended action does not limit, or necessarily indicate, what action may be taken by the City Council.

Pursuant to Government Code Section 65009, if you challenge a decision of the City Council in court, you may be limited to raising only those issues you or someone else raised at the public hearing described in this notice, or in written correspondence delivered to the City Council at, or prior to, the public hearing. You may also be limited by the ninety (90) day statute of limitations in which to challenge in court certain administrative decisions and orders (Code of Civil Procedure 1094.6) to file and serve a petition for administrative writ of mandate challenging any final City decisions regarding planning or zoning.

The decision of the City Council is final as of the date of its decision unless judicial review is initiated pursuant to California Code of Civil Procedures Section 1094.5. Any such petition for judicial review is subject to the provisions of California Code of Civil Procedure Section 1094.6.

Public Records

The agenda packet for this meeting is available at the City Manager's Office and the Benicia Public Library during regular working hours. To the extent feasible, the packet is also available on the City's web page at www.ci.benicia.ca.us under the heading "Agendas and Minutes." Public records related to an open session agenda item that are distributed after the agenda packet is prepared are available before the meeting at the City Manager's Office located at 250 East L Street, Benicia, or at the meeting held in the Council Chambers. If you wish to submit written information on an agenda item, please submit to the City Clerk as soon as possible so that it may be distributed to the City Council. A complete proceeding of each meeting is also recorded and available through the City Clerks Office.

B-4 Public Hearing Minutes

MINUTES OF THE
REGULAR MEETING – CITY COUNCIL
May 17, 2011

City Council Chambers, City Hall, 250 East L Street, complete proceedings of which are recorded on tape.

I. CALL TO ORDER:

Mayor Patterson called the meeting to order at 7:01 p.m.

II. CLOSED SESSION:

III. CONVENE OPEN SESSION:

A. ROLL CALL

All Council Members were present.

B. PLEDGE OF ALLEGIANCE

Lisa Wolfe led the Pledge of Allegiance.

C. REFERENCE TO THE FUNDAMENTAL RIGHTS OF PUBLIC

IV. ANNOUNCEMENTS/APPOINTMENTS/PROCLAMATIONS/PRESENTATIONS:

A. ANNOUNCEMENTS

1. Announcement of action taken at Closed Session, if any.

Brad Kilger, City Manager, stated that no reportable actions were taken during Closed Session.

2. Openings on Boards and Commissions:

Soltrans Public Advisory Committee: Three Full Terms Open until Filled

Sky Valley Open Space Committee: One full term to January 31, 2015 Open until filled

Civil Service Commission: One full term to January 31, 2015 Open until filled

Building Board of Appeals: Three full terms to January 31, 2015 Open until filled

Solano Transportation Authority Pedestrian Advisory Committee: One full term to January 31, 2014 Open until filled

3. Mayor's Office Hours:

4. Benicia Arsenal Update:

Mayor Patterson reviewed updates listed in the staff report.

Council Member Campbell inquired about the early scheduled meeting time (the meeting time was geared toward the businesses and property owners in the Arsenal).

B. APPOINTMENTS

1. Appointment of John Johnsen to the Economic Development Board for an unexpired term to June 30, 2011.

RESOLUTION 11-59 - A RESOLUTION CONFIRMING THE MAYOR'S APPOINTMENT OF JOHN JOHNSEN TO THE ECONOMIC DEVELOPMENT BOARD TO AN UNEXPIRED TERM ENDING JUNE 30, 2011

On motion of Mayor Patterson Council adopted the Resolution, on roll call by the following vote:
Ayes: Patterson, Schwartzman, Campbell, Hughes, Ioakimedes
Noes: (None)

2. Appointment of Anthony Shannon to the Community Sustainability Commission for a full term to January 31, 2015.

RESOLUTION 11-60 - A RESOLUTION CONFIRMING THE MAYOR'S APPOINTMENT OF ANTHONY SHANNON TO THE COMMUNITY SUSTAINABILITY COMMISSION TO A FULL TERM ENDING JANUARY 31, 2015

On motion of Mayor Patterson Council adopted the Resolution, on roll call by the following vote:
Ayes: Patterson, Schwartzman, Campbell, Hughes, Ioakimedes
Noes: (None)

C. PROCLAMATIONS

1. In recognition of National Safe Boating Week

2. In Recognition of Drowning Prevention Month

3. In Recognition of May as Older American's Month

D. PRESENTATIONS

V. ADOPTION OF AGENDA:

On motion of Vice Mayor Schwartzman, seconded by Council Member Hughes, Council adopted the Agenda, as presented, on roll call by the following vote:
Ayes: Patterson, Schwartzman, Campbell, Hughes, Ioakimedes
Noes: (None)

VI. OPPORTUNITY FOR PUBLIC COMMENT:

A. WRITTEN COMMENT

Six items received (copies on file).

B. PUBLIC COMMENT

Dennis Lowry - Mr. Lowry discussed concerns regarding Council's recent decision pertaining to the installation of wood windows at City Hall. He suggested Council look into alternative materials for the window replacements.

Council and Staff discussed Mayor Patterson's suggestion that Mr. Lowry meet with the HPRC to discuss the issue of the wood windows. Council discussed the issue of changing the bid process, design issues, the possibility of using alternative materials to recreate the look of wood, and the possibility of having the HPRC review the window policy. Staff discussed the possibility of proceeding with the current bid process, and doing an investigation into the suggestions made by Mr. Lowry.

Marilyn Bardet - Ms. Bardet discussed concern regarding the window project not being brought before the Sustainability Commission. She suggested the Sustainability Commission be included in future discussions regarding the window replacement.

VII. CONSENT CALENDAR:

Council pulled items VII.D and VII.E for discussion.
On motion of Vice Mayor Schwartzman, seconded by Council Member Hughes, Council adopted the Consent Calendar, as amended, on roll call by the following vote:
Ayes: Patterson, Schwartzman, Campbell, Hughes, Ioakimedes
Noes: (None)

A. APPROVAL OF MINUTES OF THE SPECIAL AND REGULAR MEETING OF APRIL 19, 2011, THE SPECIAL MEETING OF APRIL 26, 2011 AND THE SPECIAL MEETING OF MAY 3, 2011

On motion of Vice Mayor Schwartzman, seconded by Council Member Hughes, Council approved the minutes, on roll call by the following vote:
Ayes: Patterson, Schwartzman, Campbell, Hughes, Ioakimedes
Noes: (None)

B. SECOND READING OF AN ORDINANCE AMENDING THE BENICIA MUNICIPAL CODE TO REMOVE LISTING OF SIGN PERMIT FEES IN SECTION 18.08.030 - CITYWIDE

ORDINANCE 11-6 - AN ORDINANCE AMENDING SECTION 18.08.030 (FEES) OF CHAPTER 18.08 (PERMITS), OF TITLE 18 (SIGN ORDINANCE) OF THE BENICIA MUNICIPAL CODE

On motion of Vice Mayor Schwartzman, seconded by Council Member Hughes, Council approved the Second Reading and Adoption of the above Ordinance, on roll call by the following vote:
Ayes: Patterson, Schwartzman, Campbell, Hughes, Ioakimedes
Noes: (None)

C. REVIEW AND ACCEPTANCE OF THE INVESTMENT REPORT FOR THE QUARTER ENDED DECEMBER 2010

On motion of Vice Mayor Schwartzman, seconded by Council Member Hughes, Council accepted the investment report for the quarter ending December 2010, on roll call by the following vote:
Ayes: Patterson, Schwartzman, Campbell, Hughes, Ioakimedes
Noes: (None)

D. RECOMMENDED AMENDMENTS TO MUNICIPAL CODE SECTION 1.42.110 (CANDIDATE DEBATE) REGARDING THE DATE AND PURPOSE OF THE FORUM

Council Member Ioakimedes suggested adding 'business entity' to the list of who could submit questions for the forums.

Mayor Patterson suggested amending the language in the same section reading 'questions shall provide an opportunity for candidates to respond to or clarify last-minute hit pieces.

Council Member Hughes and Staff discussed the issue of last minute 'hit pieces' and what to do in the event there were no hit pieces. Council discussed the original intention of the Open Government Commission regarding this issue. Council discussed changing the language from 'hit piece' to 'the questions shall

provide an opportunity for the candidates to respond to, or clarify campaign issues.'

Vice Mayor Schwartzman discussed concern regarding changing the language before consulting with the Open Government Commission.

Council Member Campbell discussed the original intent of the ordinance, which was to address misinformation that was distributed.

Mark Boehme, Outside Counsel, clarified that all language should be clarified to read 'forum' rather than 'debate.'

Council discussed using the language 'misinformation or last-minute hit pieces', and calling the event a debate forum.

Council Member Ioakimedes and Staff discussed providing a mechanism in the language addressing whether the participant's attendance was required.

Vice Mayor Schwartzman discussed the need to insert language regarding cancellation of the debate forum, in the event there are no last minute hit pieces, and the event is not necessary.

Council gave direction to Staff to refer the suggestions back to the Open Government Commission to consider language that would provide for an opportunity to cancel the debate forum (via unanimous agreement of the candidates), and modify the language to provide candidates the opportunity to respond or clarify misinformation or perceptions.

Public Comment:

Dan Smith - Mr. Smith objected to the comment that there were no hit pieces in the 2009 election.

On motion of Mayor Patterson Council unanimously approved referring this item back to the Open Government Commission to consider Council's suggested language amendments, on roll call by the following vote:
Ayes: Patterson, Schwartzman, Campbell, Hughes, Ioakimedes
Noes: (None)

E. APPROVAL OF PROP 1B GRANT SUBMISSION FOR THE PURCHASE OF AN ADMINISTRATIVE STAFF CAR FOR THE BENICIA BREEZE

RESOLUTION 11-61 - A RESOLUTION AUTHORIZING THE CITY MANAGER OR HIS DESIGNEE TO EXECUTE ALL REQUIRED DOCUMENTS OF THE PUBLIC TRANSPORTATION MODERNIZATION, IMPROVEMENT, AND SERVICE ENHANCEMENT ACCOUNT PROGRAM AND AMENDMENTS

THERETO WITH THE CALIFORNIA DEPARTMENT OF TRANSPORTATION

Mayor Patterson inquired whether the car was a hybrid or clean air vehicle.

Council Member Ioakimedes and Staff discussed whether this asset would be transferred to Soltrans (it would).

Council Member Hughes and Staff discussed who would be using the vehicle, and why it was necessary to have the vehicle (staff vehicle).

Public Comment:

None

Council discussed adopting the resolution, with the direction that it be a clean air, hybrid, or clean diesel vehicle, and with the caveat that the cost does not exceed $24,000 (or cost the City any extra money).

On motion of Council Member Hughes, seconded by Council Member Ioakimedes, Council adopted the Resolution, as amended, on roll call by the following vote:
Ayes: Patterson, Schwartzman, Campbell, Hughes, Ioakimedes
Noes: (None)

F. APPROVAL TO WAIVE THE READING OF ALL ORDINANCES INTRODUCED AND ADOPTED PURSUANT TO THIS AGENDA.

VIII. BUSINESS ITEMS:

A. CITY OF BENICIA URBAN WATER MANAGEMENT PLAN - 2010 UPDATE

Carrie Wenslawski, Management Analyst, Dave Wenslawski, Water Quality Technician, and Andrea Lauch, reviewed the staff report.

Council Member Ioakimedes and Staff discussed recognizing the City's water supply as an asset. Staff discussed taking the information presented in the report and analyzing it as part of the City's business strategy.

Council Member Hughes and Staff discussed the per capita water demand, and the 13% listed as 'unaccounted for' (average is 10-20%).

Council Member Campbell and Staff discussed whether the draughts and rainy years were factored into the per capita water use, and the reserve the City is building up in the Solano Irrigation District (and the possibility of selling some of the reserve water).

Mayor Patterson reviewed the suggestions she made (copy on file). She discussed the need for a clear link on actions and activities in the City, not using the Solano Irrigation District (SID) 2,000 acre feet as additive to the City's water supply, what the recommendations were from the PURE Committee, the need for a step-by-step process of what the City would do if there was a catastrophic event relating to water, and what would be done regarding the Mojave water.

Council Member Ioakimedes requested Staff provide information on the annual rainfall in the next report.

Mayor Patterson requested information on the water temperature and precipitation be included on the chart.

Public Comment:

None

B. ACCEPTANCE OF REPORT ON CURRENT STATUS OF IT PANOCHE FACILITY

Ms. Kitty Hammer and Mr. Bruce Clark, reviewed the staff report.

Council Member Campbell and Ms. Hammer discussed where the funding was coming from.

Council Member Ioakimedes and Ms. Hammer discussed the DTSC.

Mayor Patterson and Ms. Hammer discussed the progress that has been made by DTSC in fining the responsible parties for the contamination at the site, and the need for the City to have a presence that the DTSC would recognize.

Vice Mayor Schwartzman and Ms. Hammer discussed Ms. Hammer's retirement, Staff's plans to address the vacancy, and the need to extract as much knowledge from Ms. Hammer (and Mr. Clark) as possible prior to her retirement. Staff would put together a proposal for replacement services and bring it back to Council within six months.

Mayor Patterson and Mr. Clark discussed required reports that must be filed with the Water Board.

Council Member Campbell and Mr. Clark discussed the recent rainfall, and whether there was any leaking (the slurry wall held), how long the pumps last (3-5 years), and the drums that were found with the contaminants inside.

Public Comment:

Mary Frances Kelly Poh - Ms. Kelly Poh thanked Ms. Hammer for her many years of service on this project.

Marilyn Bardet - Ms. Bardet thanked Ms. Hammer for her many years of service on this project. She stressed the importance of the City staying on top of the situation and in contact with DTSC. She suggested having Ms. Hammer talk with the replacement consultant to pass along institutional memory.

Mayor Patterson gave direction to Staff to have Ms. Hammer and Mr. Clark be a part of recruiting and educating, and possibly interviewing potential replacement consultants for this project.

Staff will work with Ms. Hammer and Mr. Clark according to their schedules.

On motion of Council Member Campbell, seconded by Council Member Hughes, Council accepted the report, and provided direction to Staff, on roll call by the following vote:
Ayes: Patterson, Schwartzman, Campbell, Hughes, Ioakimedes
Noes: (None)

C. CONSIDERATION OF REVENUE AND EXPENDITURE CHANGES, FISCAL POLICY CHANGES AND THE IMPACT ON THE FY 2010-11 MUNICIPAL BUDGETS

RESOLUTION 11-62 - A RESOLUTION APPROVING ADJUSTMENTS TO THE MUNICIPAL BUDGETS FOR FISCAL YEAR 2010-2011

Rob Sousa, Finance Director, reviewed the staff report.

Council Member Campbell and Staff clarified that the current shortfall was $2.2 million, the shortfall amount the City will be starting the next fiscal year with ($404,000).

Council Member Ioakimedes and Staff discussed the current $1.7 million deficit.

Public Comment:

Dennis Lowry - Mr. Lowry discussed the tools the FAB has come up with that would be useful for Council.

End of Public Comment

Mayor Patterson and Council Member Hughes discussed modifying the resolution so that the plan for recovery of $404,000 is done through 2011-2012.

Council Member Campbell inquired about the language regarding converting the accounts receivables to cash.

Vice Mayor Schwartzman discussed his lack of support for this item (as it is not a balanced budget).

Council and Staff discussed amending the resolution language to 'develop a plan for future approval by the City Council in obtaining the funds, such as through letters, etc.

Council Member Campbell discussed the need for four votes by Council to pass the resolution. Mayor Patterson noted that absent any other plan or program, it seemed the vote was self-evident.

Mr. Kilger re-emphasized that Staff did not ignore Council's direction to have a balanced budget. Staff and Council have identified over $2 million in expenditures. He commended Council on their accomplishments in getting close to a balanced budget.

On motion of Council Member Hughes, seconded by Council Member Campbell, Council adopted the Resolution, as amended, on roll call by the following vote:
Ayes: Patterson, Campbell, Hughes, Ioakimedes
Noes: Schwartzman

D. 2011-13 STRATEGIC PLAN UPDATE

Anne Cardwell, Administrative Services Director, reviewed the staff report.

Ms. Cardwell reviewed the suggestion made by BUSD regarding including making some additions from the General Plan, relative to goals that address BUSD. It was suggested the addition be included under Strategic Issue #3 (strengthening economic and fiscal conditions). Staff suggested adding 3 (c), under actions, which would read 'continue to collaborate with BUSD to support quality education.'

Mayor Patterson and Staff discussed language on page VIII.D.12 regarding emergency reserves. The language will be amended to read 'emergency and contingency reserves.' On page VII.D.11, regarding the overarching goal of the General Plan - sustainability, for strategic issue #2 - it needs to be carried forward for issues # 2,3,4 and 5.

Vice Mayor Schwartzman discussed page VII.D.5. He didn't agree with BUSD's requested addition, as it was already listed in other areas.

Council Member Hughes discussed why adding the suggestion by BUSD was a good idea.

Council Member Ioakimedes supported adding the language to strategy #3.

Public Comment:

Janice Adams, Superintendent, BUSD - Superintendent Adams discussed the importance of including BUSD's suggestion as a strategy in the plan. She recommended using the language 'support the BUSD's effort to maintain high quality schools.'

Dana Dean, Trustee, BUSD - Ms. Dean discussed the 4/26/11 strategy workshop. She discussed BUSD's requested addition of language. She listed the sections of the City's General Plan that are helped by the schools. She discussed the benefits the school system provides to the City.

Mr. Kilger discussed adding the language proposed by Staff (to 3 (c), with the understanding Staff could continue to work and build on it.

Mayor Patterson summarized the proposed changes:

- Add emergency and contingency reserves to Strategic Issue #3
- Add language 'continue to collaborate with BUSD to support the high quality of schools (to 3 (c))
- Utilize the sustainability overarching goals of the General Plan - Sustainability, for issue #'s 3, 4, and 5.

On motion of Council Member Hughes, seconded by Council Member Ioakimedes, Council approved the 2011-13 Strategic Plan Update, as amended, on roll call by the following vote:
Ayes: Patterson, Schwartzman, Campbell, Hughes, Ioakimedes
Noes: (None)

E. COUNCIL MEMBER COMMITTEE REPORTS

Mayor Patterson reviewed the California State Department of Parks and Recreation's draft recreation proposal for the Sacramento San Joaquin Delta and Suisun Marsh.

1. **Mayor's Committee Meeting. (Mayor Patterson) Next Meeting Date: May 18, 2011**

2. **Association of Bay Area Governments (ABAG). (Mayor Patterson and Council Member Ioakimedes) Next Meeting Date: October 13, 2011**

3. **Finance, Audit and Budget Committee. (Vice Mayor Schwartzman**

and Council Member Campbell) Next Meeting Date: May 27, 2011

4. **League of California Cities. (Mayor Patterson and Vice Mayor Schwartzman) Next Meeting Date: July 28, 2011**

5. **School Liaison Committee. (Council Members Ioakimedes and Hughes) Next Meeting Date: June 23, 2011**

6. **Sky Valley Open Space Committee. (Council Members Campbell and Hughes) Next Meeting Date: August 3, 2011**

7. **Solano EDC Board of Directors. (Mayor Patterson and Council Member Campbell) Next Meeting Date: May 26, 2011**

8. **Solano Transportation Authority (STA). (Mayor Patterson and Council Member Ioakimedes) Next Meeting Date: June 8, 2011**

9. **Solano Water Authority-Solano County Water Agency and Delta Committee. (Mayor Patterson and Vice Mayor Schwartzman) Next Meeting Date: May 12, 2011**

10. **Traffic, Pedestrian and Bicycle Safety Committee. (Council Members Hughes and Ioakimedes) Next Meeting Date: TBD**

11. **Tri-City and County Regional Parks and Open Space. (Council Members Campbell and Hughes) Next Meeting Date: June 13, 2011**

12. **Valero Community Advisory Panel (CAP). (Council Member Hughes) Next Meeting Date: TBD**

13. **Youth Action Coalition. (Vice Mayor Schwartzman and Council Member Campbell) Next Meeting Date: May 25, 2011**

14. **ABAG-CAL FED Task Force-Bay Area Water Forum. (Mayor Patterson) Next Meeting Date: June 27, 2011**

15. **SOLTRANS Joint Powers Authority (Mayor Patterson, Council Member Ioakimedes) Next Meeting Date: TBD**

IX. ADJOURNMENT:

Mayor Patterson adjourned the meeting at 10:38 p.m.

_____

Lisa Wolfe, City Clerk

Appendix C
UWMP Adoption Resolution

RESOLUTION NO. 11-77

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF BENICIA ADOPTING THE 2010 URBAN WATER MANAGEMENT PLAN AND DIRECTING STAFF TO SUBMIT THE PLAN BY THE JULY 21, 2011 DEADLINE

WHEREAS, the Urban Water Management Planning Act requires all urban water suppliers providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre-feet annually to update their Urban Water Management Plan (UWMP) at least every five years and to submit the UWMP to the Department of Water Resources; and

WHEREAS, an UWMP is required in order for a water supplier to be eligible for State administered grants, loans, and drought assistance; and

WHEREAS, the City is an urban supplier providing water to a population of approximately 28,000; and

WHEREAS, the City has updated its UWMP in compliance with the California Water Code; and

WHEREAS, the UWMP was available for public review and comment; and

WHEREAS, the City's Community Sustainability Commission recommended that the City Council adopt the Final Draft 2010 UWMP at its May 16, 2011 meeting; and

WHEREAS, a public hearing was held on May 17, 2011 to receive comments.

NOW, THEREFORE, BE IT RESOLVED THAT the City Council of the City of Benicia hereby adopts the 2010 Urban Water Management Plan.

BE IT FURTHER RESOLVED THAT City staff is directed to submit the document to the Department of Water Resources by the July 21, 2011 deadline.

*****

On motion of Council Member **Hughes**, seconded by Council Member **Ioakimedes**, the above Resolution was introduced and passed by the City Council of the City of Benicia at a regular meeting of said Council held on the 21st day of June, 2011 and adopted by the following vote:

Ayes: **Council Members Campbell, Hughes, Ioakimedes, Schwartzman and Mayor Patterson**

Noes: **None**

Absent: **None**

Elizabeth Patterson, Mayor

ATTEST:

Lisa Wolfe, City Clerk

Appendix D

Urban Water Management Plan Checklist

Appendix D
Urban Water Management Plan Checklist

No.	UWMP requirement	Calif. Water Code reference	Subject	Additional clarification	UWMP location
1	Provide baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data.	10608.20(e)	System Demands		Section 3.4, p 3-6
2	*Wholesalers:* Include an assessment of present and proposed future measures, programs, and policies to help achieve the water use reductions. *Retailers:* Conduct at least one public hearing that includes general discussion of the urban retail water supplier's implementation plan for complying with the Water Conservation Bill of 2009.	10608.36 10608.26(a)	System Demands	Retailer and wholesalers have slightly different requirements	Section 1.4.3, p 1-6 Appendices B-2, B-3, B-4 Section 3.4.3, p 3-10
3	Report progress in meeting urban water use targets using the standardized form.	10608.40	Not applicable	Standardized form not yet available	Not applicable at this time
4	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.	10620(d)(2)	Plan Preparation		Section 1.4.2, p 1-5
5	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.	10620(f)	Water Supply Reliability . . .		Section 4.5, p 4-9 Section 5.3, p 5-3
6	Every urban water supplier required to prepare a plan pursuant to this part shall, at least 60 days prior to the public hearing on the plan required by Section 10642, 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.	10621(b)	Plan Preparation		Section 1.4.3, p 1-6 Appendix B-1

No.	UWMP requirement	Calif. Water Code reference	Subject	Additional clarification	UWMP location
7	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).	10621(c)	Plan Preparation		Not applicable at this time.
8	Describe the service area of the supplier	10631(a)	System Description		Section 2.2, p 2-1
9	(Describe the service area) climate	10631(a)	System Description		Section 2.3, p 2-4
10	(Describe the service area) current and projected population . . . 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 . . .	10631(a)	System Description	Provide the most recent population data possible. Use the method described in "Baseline Daily Per Capita Water Use." See Section M.	Section 2.4, p 2-5
11	. . . (population projections) shall be in five-year increments to 20 years or as far as data is available.	10631(a)	System Description	2035 and 2040 can also be provided to support consistency with Water Supply Assessments and Written Verification of Water Supply documents.	Section 2.4, p 2-5
12	Describe . . . other demographic factors affecting the supplier's water management planning	10631(a)	System Description		Section 2.4, p 2-5

No.	UWMP requirement	Calif. Water Code reference	Subject	Additional clarification	UWMP location
13	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).	10631(b)	System Supplies	The 'existing' water sources should be for the same year as the "current population" in line 10. 2035 and 2040 can also be provided to support consistency with Water Supply Assessments and Written Verification of Water Supply documents.	Water source descriptions in Section 4.4, p 4-6 and 4.5, p 4-9 Supply estimates in Section 5.4, p 5-7
14	(Is) groundwater . . . identified as an existing or planned source of water available to the supplier . . .?	10631(b)	System Supplies	Source classifications are: surface water, groundwater, recycled water, storm water, desalinated sea water, desalinated brackish groundwater, and other.	Not applicable to Benicia, see Section 4.5.2, p 4-10

No.	UWMP requirement	Calif. Water Code reference	Subject	Additional clarification	UWMP location
15	(Provide 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. Indicate whether a groundwater management plan been adopted by the water supplier or if there is any other specific authorization for groundwater management. Include a copy of the plan or authorization.	10631(b)(1)	System Supplies		Not applicable to Benicia, see Section 4.5.2, p 4-10
16	(Provide a) description of any groundwater basin or basins from which the urban water supplier pumps groundwater.	10631(b)(2)	System Supplies		Not applicable to Benicia, see Section 4.5.2, p 4-10
17	For those basins for which a court or the board has adjudicated the rights to pump groundwater, (provide) a copy of the order or decree adopted by the court or the board	10631(b)(2)	System Supplies		Not applicable to Benicia, see Section 4.5.2, p 4-10
18	(Provide) a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree.	10631(b)(2)	System Supplies		Not applicable to Benicia, see Section 4.5.2, p 4-10
19	For basins that have not been adjudicated, (provide) 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.	10631(b)(2)	System Supplies		Not applicable to Benicia, see Section 4.5.2, p 4-10
20	(Provide 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.	10631(b)(3)	System Supplies		Not applicable to Benicia, see Section 4.5.2, p 4-10
21	(Provide 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.	10631(b)(4)	System Supplies	Provide projections for 2015, 2020, 2025, and 2030.	Not applicable to Benicia, see Section 4.5.2, p 4-10

No.	UWMP requirement	Calif. Water Code reference	Subject	Additional clarification	UWMP location
22	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: (A) An average water year, (B) A single dry water year, (C) Multiple dry water years.	10631(c)(1)	Water Supply Reliability . . .		Reliability by source in Section 5.3, p 5-3 Appendix E Appendix F Appendix G Reliability by year type in Section 5.4, p 5-7
23	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.	10631(c)(2)	Water Supply Reliability . . .		Section 5.3, p 5-3
24	Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.	10631(d)	System Supplies		Section 4.5.1, p 4-9
25	Quantify, to the extent records are available, past and current water use, and projected water use (over the same five-year increments described in subdivision (a)), 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.	10631(e)(1)	System Demands	Consider “past” to be 2005, present to be 2010, and projected to be 2015, 2020, 2025, and 2030. Provide numbers for each category for each of these years.	Section 3.2, p 3-2

No.	UWMP requirement	Calif. Water Code reference	Subject	Additional clarification	UWMP location
26	(Describe and provide a schedule of implementation for) 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.	10631(f)(1)	DMMs	Discuss each DMM, even if it is not currently or planned for implementation . Provide any appropriate schedules.	Section 6.2, p 6-2 Section 6.3, p 6-3 Section 6.4, p 6-5 Appendix I Appendix J
27	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.	10631(f)(3)	DMMs		Section 6.3, p 6-3 Section 6.4, p 6-5 Appendix I
28	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.	10631(f)(4)	DMMs		Appendix I

No.	UWMP requirement	Calif. Water Code reference	Subject	Additional clarification	UWMP location
29	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.	10631(g)	DMMs	See 10631(g) for additional wording.	All DMMs are either fully or partially implemented at this time, see Section 6.2, p 6-2. Partial implementation discussed in Section 6.4, p 6-5 and Appendix J
30	(Describe) 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.	10631(h)	System Supplies		Section 4.4, p 4-6 Section 4.5, p 4-9
31	Describe the opportunities for development of desalinated water, including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply.	10631(i)	System Supplies		Section 4.5.4, p. 4-10

No.	UWMP requirement	Calif. Water Code reference	Subject	Additional clarification	UWMP location
32	Include the annual reports submitted to meet the Section 6.2 requirement (of the MOU), if a member of the CUWCC and signer of the December 10, 2008 MOU.	10631(j)	DMMs	Signers of the MOU that submit the annual reports are deemed compliant with Items 28 and 29.	Section 6.2, p 6-2 Appendix I
33	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(k)	System Demands	Average year, single dry year, multiple dry years for 2015, 2020, 2025, and 2030.	Section 4.4, p 4-6 Section 5.3, p 5-3 Appendix E Appendix F Appendix G
34	The water use projections required by Section 10631 shall include projected water use for single-family and multifamily residential housing needed for lower income households, as defined in Section 50079.5 of the Health and Safety Code, as identified in the housing element of any city, county, or city and county in the service area of the supplier.	10631.1(a)	System Demands		Section 3.3, p 3-5
35	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.	10632(a)	Water Supply Reliability . . .		Section 5.6.3, p 5-12
36	Provide 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.	10632(b)	Water Supply Reliability . . .		Section 5.2, p 5-2

No.	UWMP requirement	Calif. Water Code reference	Subject	Additional clarification	UWMP location
37	(Identify) 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.	10632(c)	Water Supply Reliability . . .		Section 5.6.1, p 5-10 Section 5.6.6, p 5-17
38	(Identify) 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.	10632(d)	Water Supply Reliability . . .		Section 5.6.3, p 5-12
39	(Specify) 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.	10632(e)	Water Supply Reliability . . .		Section 5.6.3, p 5-12
40	(Indicated) penalties or charges for excessive use, where applicable.	10632(f)	Water Supply Reliability . . .		Section 5.6.4, p 5-14
41	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.	10632(g)	Water Supply Reliability . . .		Section 5.6.5, p 5-16
42	(Provide) a draft water shortage contingency resolution or ordinance.	10632(h)	Water Supply Reliability . . .		Section 5.6, p 5-10 Appendix H
43	(Indicate) a mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.	10632(i)	Water Supply Reliability . . .		Section 5.6.3, p 5-12
44	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	10633	System Supplies		Section 4.5.5, p 4-10

No.	UWMP requirement	Calif. Water Code reference	Subject	Additional clarification	UWMP location
45	(Describe) 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.	10633(a)	System Supplies		Section 4.5.5, p 4-10
46	(Describe) the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.	10633(b)	System Supplies		Section 4.5.5, p 4-10
47	(Describe) the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use.	10633(c)	System Supplies		Section 4.5.5, p 4-10
48	(Describe and quantify) the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, indirect potable reuse, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.	10633(d)	System Supplies		Section 4.5.5, p 4-10
49	(Describe) 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.	10633(e)	System Supplies		Section 4.5.5, p 4-10
50	(Describe the) 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.	10633(f)	System Supplies		Section 4.5.5, p 4-10
51	(Provide 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.	10633(g)	System Supplies		Section 4.5.5, p 4-10

No.	UWMP requirement	Calif. Water Code reference	Subject	Additional clarification	UWMP location
52	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.	10634	Water Supply Reliability . . .	For years 2010, 2015, 2020, 2025, and 2030	Section 5.5, p 5-9
53	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.	10635(a)	Water Supply Reliability . . .		Section 5.4, p 5-7
54	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.	10635(b)	Plan Preparation		Section 1.4.3, p 1-6
55	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.	10642	Plan Preparation		Section 1.4, p 1-5

No.	UWMP requirement	Calif. Water Code reference	Subject	Additional clarification	UWMP location
56	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.	10642	Plan Preparation		Section 1.4.3, p 1-6 Appendix B-2
57	After the hearing, the plan shall be adopted as prepared or as modified after the hearing.	10642	Plan Preparation		Section 1.5, p 1-6 Appendix C
58	An urban water supplier shall implement its plan adopted pursuant to this chapter in accordance with the schedule set forth in its plan.	10643	Plan Preparation		Section 1.5, p 1-6 Appendix C
59	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.	10644(a)	Plan Preparation		Section 1.5, p 1-6
60	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.	10645	Plan Preparation		Section 1.5, p 1-6

Appendix E

SWP Reliability Estimates (SCWA)

Appendix B State Water Project Reliability

DWR Study 2009 data - SCWA Specific

Sacramento Valley Index

Value	Year Type
W	Wet
N	Below Normal
N	Above Normal
D	Dry
D	Critically Dry

Year	Sacramento Valley Index	% Full Table A	% Full Table A for Normal Year (N)	% Full Table A for Single Dry Year (D) *	% Full Table A for Multiple Dry Year (3 or more Dry years)
1922	N	0.37	0.37		
1923	N	0.84	0.84		
1924	D	0.26		0.26	0.26
1925	D	0.39			0.39
1926	D	0.49			0.49
1927	W	0.46			
1928	N	0.86	0.86		
1929	D	0.31		0.31	0.31
1930	D	0.36			0.36
1931	D	0.22			0.22
1932	D	0.35			0.35
1933	D	0.35			0.35
1934	D	0.24			0.24
1935	N	0.43	0.43		
1936	N	0.71	0.71		
1937	N	0.66	0.66		
1938	W	0.77			
1939	D	0.96		0.96	
1940	N	0.60	0.60		
1941	W	0.59			
1942	W	0.83			
1943	W	0.77			
1944	D	0.75		0.75	
1945	N	0.44	0.44		
1946	N	0.74	0.74		
1947	D	0.74		0.74	
1948	N	0.65	0.65		
1949	D	0.58		0.58	
1950	N	0.50	0.50		
1951	N	0.43	0.43		
1952	W	0.86			
1953	W	0.89			
1954	N	0.69	0.69		
1955	D	0.51		0.51	
1956	W	0.48			

1957	N	0.82	0.82		
1958	W	0.58			
1959	N	0.83	0.83		
1960	D	0.52		0.52	
1961	D	0.49			
1962	N	0.70	0.70		
1963	W	0.46			
1964	D	0.81		0.81	
1965	W	0.54			
1966	N	0.83	0.83		
1967	W	0.55			
1968	N	0.83	0.83		
1969	W	0.66			
1970	W	0.58			
1971	W	0.83			
1972	N	0.58	0.58		
1973	N	0.45	0.45		
1974	W	0.78			
1975	W	0.79			
1976	D	0.81		0.81	
1977	D	0.14			
1978	N	0.45	0.45		
1979	N	0.65	0.65		
1980	N	0.60	0.60		
1981	D	0.84		0.84	
1982	W	0.57			
1983	W	0.64			
1984	W	0.53			
1985	D	0.77		0.77	
1986	W	0.67			
1987	D	0.55		0.55	0.55
1988	D	0.24			0.24
1989	D	0.38			0.38
1990	D	0.42			0.42
1991	D	0.20			0.20
1992	D	0.20			0.20
1993	N	0.43	0.43		
1994	D	0.67		0.67	
1995	W	0.54			
1996	W	0.85			
1997	W	0.75			
1998	W	0.91			
1999	W	0.60			
2000	W	0.86			
2001	D	0.37		0.37	
2002	D	0.42			
2003	N	0.79	0.79		
	Average	0.59	0.64	0.63	0.33

*Includes first year of consecutive dry years

Appendix B State Water Project Reliability

DWR Study 2029 data - SCWA Specific

Sacramento Valley Index

Value	Year Type
W	Wet
N	Below Normal
N	Above Normal
D	Dry
D	Critically Dry

Year	Sacramento Valley Index	% Full Table A	% Full Table A for Normal Year (N)	% Full Table A for Single Dry Year (D) *	% Full Table A for Multiple Dry Year (3 or more Dry years)
1922	N	0.64	0.64		
1923	N	0.61	0.61		
1924	D	0.20		0.20	0.20
1925	D	0.42			0.42
1926	D	0.52			0.52
1927	W	0.72			
1928	N	0.64	0.64		
1929	D	0.28		0.28	0.28
1930	D	0.41			0.41
1931	D	0.15			0.15
1932	D	0.39			0.39
1933	D	0.39			0.39
1934	D	0.27			0.27
1935	N	0.57	0.57		
1936	N	0.66	0.66		
1937	N	0.81	0.81		
1938	W	1.00			
1939	D	0.43		0.43	
1940	N	0.63	0.63		
1941	W	0.75			
1942	W	0.64			
1943	W	0.74			
1944	D	0.47		0.47	
1945	N	0.75	0.75		
1946	N	0.59	0.59		
1947	D	0.48		0.48	
1948	N	0.58	0.58		
1949	D	0.56		0.56	
1950	N	0.59	0.59		
1951	N	0.74	0.74		
1952	W	0.82			
1953	W	0.57			
1954	N	0.58	0.58		

1955	D	0.43		0.43	
1956	W	0.82			
1957	N	0.54	0.54		
1958	W	0.92			
1959	N	0.44	0.44		
1960	D	0.47		0.47	
1961	D	0.46			
1962	N	0.66	0.66		
1963	W	0.58			
1964	D	0.64		0.64	
1965	W	0.67			
1966	N	0.62	0.62		
1967	W	0.81			
1968	N	0.55	0.55		
1969	W	1.00			
1970	W	0.69			
1971	W	0.59			
1972	N	0.57	0.57		
1973	N	0.66	0.66		
1974	W	0.74			
1975	W	0.69			
1976	D	0.62		0.62	
1977	D	0.09			
1978	N	0.78	0.78		
1979	N	0.68	0.68		
1980	N	0.83	0.83		
1981	D	0.57		0.57	
1982	W	0.95			
1983	W	1.00			
1984	W	0.77			
1985	D	0.68		0.68	
1986	W	0.79			
1987	D	0.23		0.23	0.23
1988	D	0.30			0.30
1989	D	0.49			0.49
1990	D	0.19			0.19
1991	D	0.22			0.22
1992	D	0.18			0.18
1993	N	0.66	0.66		
1994	D	0.57		0.57	
1995	W	0.85			
1996	W	0.66			
1997	W	0.81			
1998	W	0.83			
1999	W	0.71			
2000	W	0.65			
2001	D	0.30		0.30	
2002	D	0.67			
2003	N	0.58	0.58		
	Average	0.60	0.64	0.46	0.31

*Includes first year of consecutive dry years

Solano County WA

SWP Table A Deliveries for 2009 Study				
Year	Delivery w/o Article 56 Carryover (taf)	Article 56 Carryover (taf)	Total Table A Delivery (taf)	Percent of Maximum Table A (47.8 taf)
1922	17.5	0.0	17.5	37%
1923	22.9	17.4	40.3	84%
1924	7.2	5.4	12.6	26%
1925	18.0	0.7	18.7	39%
1926	19.7	3.8	23.5	49%
1927	18.2	3.6	21.8	46%
1928	22.8	18.1	41.0	86%
1929	9.9	4.9	14.9	31%
1930	15.0	2.1	17.0	36%
1931	7.4	3.0	10.5	22%
1932	14.8	2.1	16.9	35%
1933	15.1	1.4	16.5	35%
1934	8.2	3.0	11.3	24%
1935	18.3	2.2	20.5	43%
1936	20.2	13.6	33.8	71%
1937	21.1	10.3	31.3	66%
1938	23.7	13.2	36.9	77%
1939	22.1	23.7	45.8	96%
1940	21.9	7.0	28.9	60%
1941	20.8	7.3	28.1	59%
1942	19.0	20.8	39.7	83%
1943	18.9	17.9	36.7	77%
1944	18.5	17.5	36.0	75%
1945	17.7	3.4	21.1	44%
1946	17.7	17.7	35.4	74%
1947	20.9	14.6	35.4	74%
1948	21.6	9.2	30.8	65%
1949	22.9	4.7	27.6	58%
1950	20.8	5.5	26.3	55%
1951	18.3	2.0	20.3	43%
1952	22.7	18.3	40.9	86%
1953	19.8	22.6	42.4	89%
1954	22.1	11.1	33.2	69%
1955	19.7	4.8	24.5	51%
1956	20.8	1.9	22.7	48%
1957	18.6	20.7	39.3	82%
1958	23.7	3.9	27.7	58%
1959	18.9	20.5	39.4	83%

Probability Curve			
Year	SWP Total Table A Delivery (taf)	Exceedence Frequency (%)	Percent of Maximum Table A (47.8 taf)
1939	45.8	0%	96%
1998	43.4	1%	91%
1953	42.4	2%	89%
1928	41.0	4%	86%
1952	40.9	5%	86%
2000	40.9	6%	86%
1996	40.8	7%	85%
1923	40.3	9%	84%
1981	40.1	10%	84%
1971	39.9	11%	83%
1942	39.7	12%	83%
1968	39.7	14%	83%
1966	39.4	15%	83%
1959	39.4	16%	83%
1957	39.3	17%	82%
1964	38.8	19%	81%
1976	38.7	20%	81%
2003	37.9	21%	79%
1975	37.6	22%	79%
1974	37.2	23%	78%
1985	36.9	25%	77%
1938	36.9	26%	77%
1943	36.7	27%	77%
1944	36.0	28%	75%
1997	35.8	30%	75%
1947	35.4	31%	74%
1946	35.4	32%	74%
1936	33.8	33%	71%
1962	33.5	35%	70%
1954	33.2	36%	69%
1986	31.9	37%	67%
1994	31.8	38%	67%
1969	31.7	40%	66%
1937	31.3	41%	66%
1979	31.0	42%	65%
1948	30.8	43%	65%
1983	30.7	44%	64%
1940	28.9	46%	60%

Solano County WA

SWP Table A Deliveries for 2009 Study				
Year	Delivery w/o Article 56 Carryover (taf)	Article 56 Carryover (taf)	Total Table A Delivery (taf)	Percent of Maximum Table A (47.8 taf)
1960	21.0	4.0	25.0	52%
1961	19.1	4.5	23.6	49%
1962	21.3	12.2	33.5	70%
1963	17.3	4.6	21.9	46%
1964	21.5	17.3	38.8	81%
1965	17.7	8.1	25.8	54%
1966	21.8	17.7	39.4	83%
1967	18.9	7.6	26.5	55%
1968	20.8	18.9	39.7	83%
1969	23.7	7.9	31.7	66%
1970	18.3	9.5	27.9	58%
1971	21.6	18.3	39.9	83%
1972	22.9	4.7	27.5	58%
1973	16.6	4.9	21.6	45%
1974	20.6	16.6	37.2	78%
1975	17.0	20.6	37.6	79%
1976	21.7	17.0	38.7	81%
1977	2.1	4.7	6.8	14%
1978	21.0	0.5	21.5	45%
1979	18.3	12.7	31.0	65%
1980	21.7	6.7	28.4	60%
1981	19.0	21.1	40.1	84%
1982	23.7	3.5	27.2	57%
1983	23.7	7.0	30.7	64%
1984	18.4	6.9	25.3	53%
1985	18.6	18.3	36.9	77%
1986	20.6	11.3	31.9	67%
1987	14.7	11.6	26.3	55%
1988	8.4	3.0	11.3	24%
1989	16.5	1.6	18.2	38%
1990	8.1	11.9	20.0	42%
1991	8.4	1.4	9.8	20%
1992	7.8	2.0	9.8	20%
1993	18.9	1.9	20.7	43%
1994	18.2	13.6	31.8	67%
1995	21.8	3.9	25.8	54%
1996	19.0	21.8	40.8	85%
1997	20.6	15.2	35.8	75%

Probability Curve			
Year	SWP Total Table A Delivery (taf)	Exceedence Frequency (%)	Percent of Maximum Table A (47.8 taf)
1999	28.7	47%	60%
1980	28.4	48%	60%
1941	28.1	49%	59%
1970	27.9	51%	58%
1958	27.7	52%	58%
1949	27.6	53%	58%
1972	27.5	54%	58%
1982	27.2	56%	57%
1967	26.5	57%	55%
1987	26.3	58%	55%
1950	26.3	59%	55%
1965	25.8	60%	54%
1995	25.8	62%	54%
1984	25.3	63%	53%
1960	25.0	64%	52%
1955	24.5	65%	51%
1961	23.6	67%	49%
1926	23.5	68%	49%
1956	22.7	69%	48%
1963	21.9	70%	46%
1927	21.8	72%	46%
1973	21.6	73%	45%
1978	21.5	74%	45%
1945	21.1	75%	44%
1993	20.7	77%	43%
1935	20.5	78%	43%
1951	20.3	79%	43%
2002	20.2	80%	42%
1990	20.0	81%	42%
1925	18.7	83%	39%
1989	18.2	84%	38%
2001	17.6	85%	37%
1922	17.5	86%	37%
1930	17.0	88%	36%
1932	16.9	89%	35%
1933	16.5	90%	35%
1929	14.9	91%	31%
1924	12.6	93%	26%

Solano County WA

SWP Table A Deliveries for 2009 Study					Probability Curve			
Year	Delivery w/o Article 56 Carryover (taf)	Article 56 Carryover (taf)	Total Table A Delivery (taf)	Percent of Maximum Table A (47.8 taf)	Year	SWP Total Table A Delivery (taf)	Exceedence Frequency (%)	Percent of Maximum Table A (47.8 taf)
1998	22.9	20.6	43.4	91%	1988	11.3	94%	24%
1999	18.2	10.5	28.7	60%	1934	11.3	95%	24%
2000	23.0	17.9	40.9	86%	1931	10.5	96%	22%
2001	12.7	5.0	17.6	37%	1992	9.8	98%	20%
2002	17.7	2.5	20.2	42%	1991	9.8	99%	20%
2003	23.5	14.4	37.9	79%	1977	6.8	100%	14%
Average	18.5	9.8	28.3	59%		28.3		59%
Maximum	23.7	23.7	45.8	96%		45.8		96%
Minimum	2.1	0.0	6.8	14%		6.8		14%

Solano County WA

SWP Table A Deliveries for 2029 Study					Probability Curve			
Year	Delivery w/o Article 56 Carryover (taf)	Article 56 Carryover (taf)	Total Table A Delivery (taf)	Percent of Maximum Table A (47.8 taf)	Year	SWP Total Table A Delivery (taf)	Exceedence Frequency (%)	Percent of Maximum Table A (47.8 taf)
1922	30.6	0.0	30.6	64%	1983	47.8	0%	100%
1923	29.3	0.0	29.3	61%	1938	47.8	1%	100%
1924	9.5	0.0	9.5	20%	1969	47.8	2%	100%
1925	19.9	0.0	19.9	42%	1982	45.6	4%	95%
1926	24.7	0.0	24.7	52%	1958	44.0	5%	92%
1927	34.4	0.0	34.4	72%	1995	40.5	6%	85%
1928	30.6	0.0	30.6	64%	1980	39.8	7%	83%
1929	13.5	0.0	13.5	28%	1998	39.4	9%	83%
1930	19.8	0.0	19.8	41%	1956	39.1	10%	82%
1931	7.1	0.0	7.1	15%	1952	39.1	11%	82%
1932	18.4	0.0	18.4	39%	1967	38.9	12%	81%
1933	18.5	0.0	18.5	39%	1997	38.6	14%	81%
1934	12.8	0.0	12.8	27%	1937	38.6	15%	81%
1935	27.0	0.0	27.0	57%	1986	37.6	16%	79%
1936	31.3	0.0	31.3	66%	1978	37.1	17%	78%
1937	38.6	0.0	38.6	81%	1984	36.8	19%	77%
1938	47.8	0.0	47.8	100%	1941	35.7	20%	75%
1939	20.4	0.0	20.4	43%	1945	35.7	21%	75%
1940	30.3	0.0	30.3	63%	1974	35.4	22%	74%
1941	35.7	0.0	35.7	75%	1943	35.3	23%	74%
1942	30.5	0.0	30.5	64%	1951	35.3	25%	74%
1943	35.3	0.0	35.3	74%	1927	34.4	26%	72%
1944	22.6	0.0	22.6	47%	1999	34.1	27%	71%
1945	35.7	0.0	35.7	75%	1975	33.1	28%	69%
1946	28.3	0.0	28.3	59%	1970	32.9	30%	69%
1947	22.9	0.0	22.9	48%	1979	32.4	31%	68%
1948	27.9	0.0	27.9	58%	1985	32.3	32%	68%
1949	26.5	0.0	26.5	56%	1965	32.1	33%	67%
1950	28.3	0.0	28.3	59%	2002	32.0	35%	67%
1951	35.3	0.0	35.3	74%	1962	31.7	36%	66%
1952	39.1	0.0	39.1	82%	1973	31.6	37%	66%
1953	27.4	0.0	27.4	57%	1993	31.5	38%	66%
1954	27.8	0.0	27.8	58%	1996	31.4	40%	66%
1955	20.5	0.0	20.5	43%	1936	31.3	41%	66%
1956	39.1	0.0	39.1	82%	2000	31.1	42%	65%
1957	25.6	0.0	25.6	54%	1964	30.7	43%	64%
1958	44.0	0.0	44.0	92%	1928	30.6	44%	64%
1959	21.0	0.0	21.0	44%	1922	30.6	46%	64%

Solano County WA

SWP Table A Deliveries for 2029 Study				
Year	Delivery w/o Article 56 Carryover (taf)	Article 56 Carryover (taf)	Total Table A Delivery (taf)	Percent of Maximum Table A (47.8 taf)
1960	22.4	0.0	22.4	47%
1961	22.0	0.0	22.0	46%
1962	31.7	0.0	31.7	66%
1963	27.6	0.0	27.6	58%
1964	30.7	0.0	30.7	64%
1965	32.1	0.0	32.1	67%
1966	29.6	0.0	29.6	62%
1967	38.9	0.0	38.9	81%
1968	26.5	0.0	26.5	55%
1969	47.8	0.0	47.8	100%
1970	32.9	0.0	32.9	69%
1971	28.0	0.0	28.0	59%
1972	27.5	0.0	27.5	57%
1973	31.6	0.0	31.6	66%
1974	35.4	0.0	35.4	74%
1975	33.1	0.0	33.1	69%
1976	29.7	0.0	29.7	62%
1977	4.5	0.0	4.5	9%
1978	37.1	0.0	37.1	78%
1979	32.4	0.0	32.4	68%
1980	39.8	0.0	39.8	83%
1981	27.4	0.0	27.4	57%
1982	45.6	0.0	45.6	95%
1983	47.8	0.0	47.8	100%
1984	36.8	0.0	36.8	77%
1985	32.3	0.0	32.3	68%
1986	37.6	0.0	37.6	79%
1987	10.8	0.0	10.8	23%
1988	14.1	0.0	14.1	30%
1989	23.4	0.0	23.4	49%
1990	9.3	0.0	9.3	19%
1991	10.4	0.0	10.4	22%
1992	8.4	0.0	8.4	18%
1993	31.5	0.0	31.5	66%
1994	27.4	0.0	27.4	57%
1995	40.5	0.0	40.5	85%
1996	31.4	0.0	31.4	66%
1997	38.6	0.0	38.6	81%

Probability Curve			
Year	SWP Total Table A Delivery (taf)	Exceedence Frequency (%)	Percent of Maximum Table A (47.8 taf)
1942	30.5	47%	64%
1940	30.3	48%	63%
1976	29.7	49%	62%
1966	29.6	51%	62%
1923	29.3	52%	61%
1950	28.3	53%	59%
1946	28.3	54%	59%
1971	28.0	56%	59%
1948	27.9	57%	58%
1954	27.8	58%	58%
2003	27.7	59%	58%
1963	27.6	60%	58%
1972	27.5	62%	57%
1981	27.4	63%	57%
1994	27.4	64%	57%
1953	27.4	65%	57%
1935	27.0	67%	57%
1949	26.5	68%	56%
1968	26.5	69%	55%
1957	25.6	70%	54%
1926	24.7	72%	52%
1989	23.4	73%	49%
1947	22.9	74%	48%
1944	22.6	75%	47%
1960	22.4	77%	47%
1961	22.0	78%	46%
1959	21.0	79%	44%
1955	20.5	80%	43%
1939	20.4	81%	43%
1925	19.9	83%	42%
1930	19.8	84%	41%
1933	18.5	85%	39%
1932	18.4	86%	39%
2001	14.5	88%	30%
1988	14.1	89%	30%
1929	13.5	90%	28%
1934	12.8	91%	27%
1987	10.8	93%	23%

Solano County WA

SWP Table A Deliveries for 2029 Study					Probability Curve			
Year	Delivery w/o Article 56 Carryover (taf)	Article 56 Carryover (taf)	Total Table A Delivery (taf)	Percent of Maximum Table A (47.8 taf)	Year	SWP Total Table A Delivery (taf)	Exceedence Frequency (%)	Percent of Maximum Table A (47.8 taf)
1998	39.4	0.0	39.4	83%	1991	10.4	94%	22%
1999	34.1	0.0	34.1	71%	1924	9.5	95%	20%
2000	31.1	0.0	31.1	65%	1990	9.3	96%	19%
2001	14.5	0.0	14.5	30%	1992	8.4	98%	18%
2002	32.0	0.0	32.0	67%	1931	7.1	99%	15%
2003	27.7	0.0	27.7	58%	1977	4.5	100%	9%
Average	28.4	0.0	28.4	60%		28.4		60%
Maximum	47.8	0.0	47.8	100%		47.8		100%
Minimum	4.5	0.0	4.5	9%		4.5		9%

Appendix F

Settlement Water Reliability Analysis (CH2M-Hill)

Supplemental Water Supply Assessment in Support of the City of Benicia Urban Water Management Plan

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REVIEWED BY: Greg Eldridge, P.E.

DATE: October 23, 2005

I. Introduction

This technical memorandum (TM) provides supporting water supply analysis to the City of Benicia's Urban Water Management Plan. This analysis addresses the expected reliability of water to be provide to the City in accordance with (1) Table A entitlement supplies as proposed in the modified State Water Project (SWP) Delivery Reliability Report; and (2) the *Settlement Agreement Among the Department of Water Resources of the State of California, Solano County Water Agency, and Cities of Fairfield, Vacaville, and Benicia for Purposes of Water Supply,* dated May 19, 2003. This water is referred to as "Settlement Water."

The analysis will be consistent with studies supporting (1) the *Agreement for Conveying Settlement Water Through the North Bay Aqueduct by the Department of Water Resources to the Solano County Water Agency for the Cities of Fairfield, Vacaville, and Benicia,* dated May 19, 2003; (2) the *Agreement Regarding Priorities for Non-Project Water Transported through the North Bay Aqueduct by and between the Solano County Water Agency and the Cities of Fairfield, Benicia, Vallejo, and Vacaville,* dated March 18, 2003; and (3) the *"Supplemental Analysis in Support of the City of Vacaville SB 610 Water Supply Assessment"*, dated January 9, 2004.

This study addresses the expected reliability of Settlement Water and SWP water to meet projected City of Benicia water demands. This analysis is not inclusive of all water supply sources available to the City of Benicia and does not address the City's ability to meet their full water demand with all available supply sources.

II. Analysis Methods

To determine the expected reliability of Benicia's water supplies, a supply simulation model was utilized. Water supply reliability was analyzed on an annual basis in the context of two water supply sources used by the City, SWP and Settlement Water. The model used in this supplemental analysis, SOLANO_SIM, was developed for the Draft Environmental Impact Report (DEIR) for the *Cities of Fairfield, Vacaville, and Benicia Water Rights Appropriations Project* (2001). The Settlement Agreement with DWR was a result of negotiations to protests by DWR and the State Water Contractors to the area of origin water right applications filed by the Cities of Vacaville, Fairfield and Benicia.

Simulation Modeling for Benicia Water Supplies

SOLANO_SIM model simulation runs were performed using a monthly timestep. The model simulated the SWP's North Bay Aqueduct (NBA), the primary conveyance facility needed to serve the cities of Vacaville, Fairfield, and Benicia. The model determines deliveries to these cities monthly while adhering to the physical and operational limitations of the NBA.

The NBA was constructed to serve areas in Solano and Napa Counties. SWP Table A contract deliveries to Solano County Water Agency (purveyor to Vacaville, Fairfield, and Benicia), the Cities of Vallejo and Napa, and other contractors are simulated in SOLANO_SIM. Barker Slough Pumping Plant (BSPP) lifts water from Barker Slough into the NBA with a stated physical capacity of 175 cubic feet per second[1]. Settlement Water is assumed delivered through any remaining BSPP and NBA simulated conveyance capacities. The simulation model, additionally, performs tests for excess NBA capacity at (1) the North Bay Regional Water Treatment Plant, and (2) the turnouts to Vallejo and Napa.

Excess capacity is computed monthly to determine the physical potential to deliver Settlement Water to each city. Excess capacity is shared in proportion to the maximum settlement amount (Vacaville/Fairfield/Benicia – 9.32/11.80/10.50). Simulations of delivery of Settlement Water consider all senior users of the NBA. Deliveries are not simulated if physical capacity of the NBA has been reached in any month.

SOLANO_SIM utilizes monthly distributions of the aforementioned supplies. The deliveries of water through the NBA to the three cities are premised on the 73-year output (1922 – 1994 simulation) from updated CALSIM II simulation results provided by DWR. DWR is preparing an update of the SWP Delivery Reliability Report issued in 2003. Many SWP Contractors (including Benicia) have begun preparation of their 2005 Urban Water Management Plan (UWMP). While the final report will not be available until after September 2005, DWR has released preliminary results regarding simulated annual deliveries acceptable for use in updating UWMPs. In this analysis, simulated monthly NBA deliveries were determined by using the previous study's monthly NBA values to prorate the new annual values on a monthly basis.

Another water delivery provision critical to evaluating the overall water supply reliability for the City of Benicia involves the contract provision limiting SWP deliveries in a single month to 11% of the SWP contract total. The simulation model is consistent with this contract provision.

State Water Resources Control Board (SWRCB) Standard Term 91 applies to months when the Delta is in balanced conditions and the SWP and the Central Valley Project are releasing water to meet minimum Delta flow and water quality standards.[2] Since Settlement Water is not available to Benicia when Term 91 is in effect, SOLANO_SIM restricts use of that source during those months.

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[1] The existing available capacity of the NBA may be less than that originally designed. Studies are underway to assess and address any capacity limitations. However, minor reductions in the capacity of the NBA are unlikely to affect the results of this technical memorandum.

[2] Term 91 months were established in SWRCB Decision 1641.

Analysis Model Run

Benicia's projected water supply under the 2020 buildout demand[3] of 13,527 acre-feet per year was simulated for the hydrology record 1922 - 1994. This value was used to simulate all year types. On a monthly basis, Benicia's total demand consists of water needed by both the City of Benicia and Valero. All non-Valero water is provided on a seasonal usage pattern, as described by the City of Benicia. This monthly demand pattern at buildout is described in Table 1. The annual use ratio for a given month is used to determine Benicia's monthly water demand without accounting for deliveries to Valero. Valero's raw water demand is considered steady year-round. Projected deliveries to Valero are added to Benicia's demand each month to determine Benicia's total demand.

TABLE 1
City of Benicia – Monthly Average Demand Pattern at 2020 Buildout

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Annual use %	8.92	6.42	6.25	6.00	5.67	6.00	7.50	9.17	11.17	11.67	11.25	10.00	100.00
Benicia (Ac-ft)	689	496	483	463	438	463	579	708	862	901	869	772	7,727
Valero (Ac-ft)	493	477	493	493	445	493	477	493	477	493	493	477	5,800
Total Demand (Ac-ft)	1,182	973	976	956	883	956	1,056	1,201	1,339	1,394	1,362	1,249	13,527
Total % Distribution	8.74	7.19	7.22	7.07	6.53	7.07	7.81	8.88	9.90	10.31	10.07	9.23	100.00

Source: City of Benicia

To determine the expected reliability of Settlement Water over an entire year, it must be analyzed in conjunction with other sources used by the City of Benicia – in the case of this analysis, SWP supplies only. As noted above, this analysis is not inclusive of all water supply sources available to the City of Benicia and does not address the City's ability to meet their full water demand with all available supply sources. The simulation modeling objective is to meet the monthly Benicia water demand with available SWP and Settlement Water. The model has a predefined priority system to determine which supplies are used within operational and physical constraints.

For example, under the terms of the Settlement Agreement, DWR is not required to make Settlement Water available to SCWA and Benicia when Term 91 condition is in effect. This condition typically occurs during the late spring and summer months of the year and ranges from three to five months in duration. During these months, the simulation model indicates that Benicia will rely on SWP water. The model simulates delivery of this water while adhering to all allocated capacity rules on the NBA and SWP contract peak monthly flow constraints.

The model maximizes use of Settlement Water in months when Term 91 is not in effect. By utilizing Settlement Water during these months, the city is able to maximize its use of Settlement Water on an annual basis and use SWP water to meet demands during Term 91 months.

[3] Year 2020 and beyond build-out demand provided by City of Benicia.

III. Expected Reliability of Water Supplies

The expected reliability Benicia's water supplies were analyzed on an annual basis within the context of SWP and Settlement Water. Table 2 shows the annual results from the SOLANO_SIM run for Benicia's buildout level of demand. The table shows how the mix of water supply changes from year to year. In most years, full demand is met on an annual basis by a combination of SWP and Settlement Water. In some years, other supply sources will be needed to meet the City's full water demand.

TABLE 2
SOLANO_SIM Model Results over 73-year Hydrology for Benicia Under Buildout (2020) Demand Conditions
1922-1994 Hydrology (thousand acre-feet)

Calendar Year	Demand	Settlement Water	SWP	Total of Settlement Water and SWP	Shortage
1922	13.53	7.16	6.37	13.53	0.00
1923	13.53	7.56	5.97	13.53	0.00
1924	13.53	7.18	0.65	7.82	5.71
1925	13.53	8.23	2.23	10.46	3.07
1926	13.53	8.03	5.49	13.53	0.00
1927	13.53	6.88	6.65	13.53	0.00
1928	13.53	8.39	5.14	13.53	0.00
1929	13.53	7.18	1.73	8.90	4.63
1930	13.53	8.02	5.51	13.53	0.00
1931	13.53	7.18	1.68	8.86	4.67
1932	13.53	8.23	2.72	10.95	2.58
1933	13.53	7.18	3.81	10.98	2.55
1934	13.53	7.18	2.95	10.13	3.40
1935	13.53	6.18	7.34	13.53	0.00
1936	13.53	6.72	6.80	13.53	0.00
1937	13.53	7.55	5.98	13.53	0.00
1938	13.53	7.38	6.15	13.53	0.00
1939	13.53	7.45	6.08	13.53	0.00
1940	13.53	6.67	6.85	13.53	0.00
1941	13.53	7.79	5.73	13.53	0.00
1942	13.53	6.98	6.55	13.53	0.00
1943	13.53	7.65	5.88	13.53	0.00
1944	13.53	7.18	6.35	13.53	0.00
1945	13.53	6.83	6.70	13.53	0.00
1946	13.53	7.19	6.33	13.53	0.00
1947	13.53	7.96	5.57	13.53	0.00

TABLE 2
SOLANO_SIM Model Results over 73-year Hydrology for Benicia Under Buildout (2020) Demand Conditions
1922-1994 Hydrology (thousand acre-feet)

Calendar Year	Demand	Settlement Water	SWP	Total of Settlement Water and SWP	Shortage
1948	13.53	8.87	4.66	13.53	0.00
1949	13.53	8.23	5.23	13.46	0.07
1950	13.53	8.49	5.04	13.53	0.00
1951	13.53	6.57	6.96	13.53	0.00
1952	13.53	7.66	5.87	13.53	0.00
1953	13.53	6.46	7.07	13.53	0.00
1954	13.53	6.22	7.31	13.53	0.00
1955	13.53	8.23	2.09	10.33	3.20
1956	13.53	7.16	6.37	13.53	0.00
1957	13.53	8.60	4.93	13.53	0.00
1958	13.53	7.38	6.15	13.53	0.00
1959	13.53	7.59	5.94	13.53	0.00
1960	13.53	8.23	2.65	10.88	2.65
1961	13.53	7.81	5.72	13.53	0.00
1962	13.53	8.37	5.15	13.53	0.00
1963	13.53	6.88	6.65	13.53	0.00
1964	13.53	8.22	4.66	12.88	0.65
1965	13.53	8.69	4.84	13.53	0.00
1966	13.53	6.86	6.66	13.53	0.00
1967	13.53	7.23	6.29	13.53	0.00
1968	13.53	8.46	5.07	13.53	0.00
1969	13.53	7.86	5.67	13.53	0.00
1970	13.53	6.63	6.90	13.53	0.00
1971	13.53	7.16	6.37	13.53	0.00
1972	13.53	9.43	2.97	12.40	1.13
1973	13.53	7.15	6.38	13.53	0.00
1974	13.53	7.16	6.37	13.53	0.00
1975	13.53	6.87	6.66	13.53	0.00
1976	13.53	7.07	5.98	13.05	0.48
1977	13.53	7.18	0.47	7.65	5.88
1978	13.53	7.94	5.59	13.53	0.00
1979	13.53	7.75	5.78	13.53	0.00
1980	13.53	8.34	5.19	13.53	0.00

TABLE 2
SOLANO_SIM Model Results over 73-year Hydrology for Benicia Under Buildout (2020) Demand Conditions
1922-1994 Hydrology (thousand acre-feet)

Calendar Year	Demand	Settlement Water	SWP	Total of Settlement Water and SWP	Shortage
1981	13.53	7.19	6.34	13.53	0.00
1982	13.53	7.37	6.15	13.53	0.00
1983	13.53	7.86	5.67	13.53	0.00
1984	13.53	7.04	6.48	13.53	0.00
1985	13.53	7.52	6.01	13.53	0.00
1986	13.53	9.40	3.68	13.07	0.46
1987	13.53	7.41	6.11	13.53	0.00
1988	13.53	7.18	0.57	7.75	5.78
1989	13.53	7.07	6.46	13.53	0.00
1990	13.53	7.18	1.16	8.33	5.20
1991	13.53	7.18	1.67	8.84	4.69
1992	13.53	7.18	2.05	9.22	4.31
1993	13.53	7.45	6.08	13.53	0.00
1994	13.53	7.83	5.70	13.53	0.00
Maximum	13.53	9.43	7.34	13.53	5.88
Average	13.53	7.53	5.16	12.69	0.84
Minimum	13.53	6.18	0.47	7.65	0.00

Conclusions

Table 3 gives the average monthly distribution of Benicia's water supply in Single Normal Years, Single Dry Years, and Multiple Dry Years to conform to Water Code section 10631. The definitions of these three year types are consistent with the City of Benicia's Urban Water Management Plan. The water type designations were based on the DWR Sacramento Valley Water Year Index and provided to the City of Benicia by the City of Vacaville (as shown in Attachment 1.) Based on the City of Benicia's definitions for Normal Year, Single Dry Year, and Multiple Dry Years, SWP Table A entitlements were averaged to determine Benicia deliveries.

As shown in Table 3, months without Settlement Water delivery are generally months when Term 91 is in effect. Demand during these months is met with SWP water, adhering to physical and operational constraints. This table illustrates that, on average, Benicia must rely on its other supply sources periodically during all three year types.

TABLE 3
SOLANO_SIM Model Results on Monthly Basis for Benicia Under Buildout (2020) Demand Conditions
1922-1994 Hydrology (thousand acre-feet)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Total
Single Normal Year[1]													
Settlement Water	096	0.88	0.96	0.90	0.72	0.00	0.00	0.00	0.61	0.65	0.95	0.98	7.60
SWP Supply	0.00	0.00	0.00	0.16	0.48	1.33	1.38	1.35	0.64	0.53	0.03	0.00	5.88
Total Supply	0.96	0.88	.96	1.06	1.20	1.33	1.38	1.35	1.25	1.18	0.97	0.98	13.48
Shortage	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.02	0.00	0.00	0.00	0.00	0.05
Single Dry Year[2]													
	JAN	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**	**Total**
Settlement Water	0.96	0.88	0.96	0.81	0.00	0.00	0.00	0.00	1.04	1.03	0.97	0.98	7.62
SWP Supply	0.00	0.00	0.00	0.12	0.96	1.03	1.06	1.05	0.21	0.15	0.00	0.00	4.57
Total Supply	0.96	0.88	0.96	0.92	0.96	1.03	1.06	1.05	1.25	1.18	0.97	0.98	12.19
Shortage	0.00	0.00	0.00	0.14	0.24	0.31	0.34	0.32	0.00	0.00	0.00	0.00	1.34
Multiple Dry Years[3]													
	JAN	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**	**Total**
Settlement Water	0.96	0.88	0.96	0.52	0.00	0.00	0.00	0.00	1.09	1.07	0.97	0.96	7.43
SWP Supply	0.00	0.00	0.00	0.12	0.67	0.72	0.74	0.73	0.16	0.11	0.00	0.00	3.24
Total Supply	0.96	0.88	0.96	0.64	0.67	0.72	0.74	0.73	1.25	1.18	0.97	0.98	10.67
Shortage	0.00	0.00	0.00	0.42	0.53	0.62	0.65	0.63	0.00	0.00	0.00	0.00	2.86

Notes:
[1] Normal year delivery calculated based on an average of all SWP Table A entitlements in year types 2 and 3 (above normal and below normal) over the 73-year study period.
[2] Single dry year delivery calculated based on an average of all SWP Table A entitlements in year types 4 and 5 (solitary dry/critical dry year or the first year of multiple dry/critical dry years.)
[3] Multiple dry years delivery calculated based on an average all SWP Table A entitlements in year types 4 and 5 for four consecutive years.

Attachment 1: SWP Water Supply Availability

Table created for the City of Vacaville and provided to CH2M HILL by the City of Benicia.

STATE WATER PROJECT WATER SUPPLY AVAILABILITY

July 20, 2005

SWP M&I Allocations

TABLE DEVELOPMENT

The following table is based on the DWR CALSIM II Model Studies for State Water Project Delivery Capability and the Notice to State Water Project Contractors, May 25, 2005, using the City of Vacaville's definitions for normal year, single dry year, and multiple dry years. (Reference notes (2), (3), and (4) below).

A. The Sacramento Valley 40/30/30 Index is used to identify yeartypes.

B. Based on definitions for normal, single dry, and multiple dry year conditions, as outlined in the City's adpoted Urban Water Mgmt Plan, entitlement figures are placed in the corresponding columns for each defined year condition. Figures for wet years (Value 1) are omitted.

C. The columns are averaged to obtain a reliable percentage of available water supply under each of the stated conditions.

Sacramento Valley 40/30/30/ Index

Value	Yeartype
1	Wet
2	Above Normal
3	Below Normal
4	Dry
5	Critical Dry

Year	Sacramento Valley 40/30/30 Index (1)	2020 Level of Development Full Table A (1)	2020 Full Entitlement Numbers for Normal Year (2)	2020 Full Entitlement Numbers for Single Dry Year (3)	2020 Full Entitlement Numbers for Multiple Dry Years (4)
1922	2	1.00	1.00		
1923	3	1.00	1.00		
1924	5	0.09		0.09	
1925	4	0.36			
1926	4	0.66			
1927	1	1.00			
1928	2	0.82	0.82		
1929	5	0.27		0.27	0.27
1930	4	0.66			0.66
1931	5	0.26			0.26
1932	4	0.38			0.38
1933	5	0.32			
1934	5	0.36			
1935	3	0.98	0.98		
1936	3	0.90	0.90		
1937	3	0.82	0.82		
1938	1	1.00			
1939	4	0.83		0.83	
1940	2	1.00	1.00		
1941	1	0.95			
1942	1	1.00			
1943	1	0.92			
1944	4	0.86		0.86	
1945	3	0.94	0.94		
1946	3	0.93	0.93		
1947	4	0.67		0.67	
1948	3	0.71	0.71		
1949	4	0.49		0.49	
1950	3	0.82	0.82		
1951	2	1.00	1.00		
1952	1	0.95			
1953	1	1.00			
1954	2	1.00	1.00		
1955	4	0.36		0.36	
1956	1	1.00			
1957	2	0.86	0.86		

1958	1	1.00			
1959	3	0.92	0.92		
1960	4	0.39		0.39	
1961	4	0.66			
1962	3	0.80	0.80		
1963	1	1.00			
1964	4	0.70		0.70	
1965	1	0.84			
1966	3	1.00	1.00		
1967	1	1.00			
1968	3	0.82	0.82		
1969	1	0.95			
1970	1	1.00			
1971	1	1.00			
1972	3	0.66	0.66		
1973	2	0.98	0.98		
1974	1	1.00			
1975	1	1.00			
1976	5	0.76		0.76	
1977	5	0.05			
1978	2	0.94	0.94		
1979	3	0.91	0.91		
1980	2	0.85	0.85		
1981	4	0.92		0.92	
1982	1	1.00			
1983	1	0.95			
1984	1	1.00			
1985	4	0.83		0.83	
1986	1	0.69			
1987	4	0.80		0.80	0.80
1988	5	0.10			0.10
1989	4	0.85			0.85
1990	5	0.21			0.21
1991	5	0.21			
1992	5	0.35			
1993	2	1.00	1.00		
		Average	0.90	0.61	0.44

Source: City of Vacaville, Utilities Division

(1) Source: CALSIM II Model Studies for SWP Delivery Capability Report, May 17, 2002; and DWR Notice to State Water Project Contractors, May 25, 2005.

(2) Normal delivery calculated based on average of yeartypes 2 & 3, above normal and below normal.

(3) Single dry year delivery calculated based on average of yeartypes 4 & 5, solitary dry/critical dry year or the first year of multiple dry/critical dry years.

(4) Multiple dry delivery calculated based on average of yeartypes 4 & 5 for four (4) consecutive years. This is consistent with the City of Vacaville 2000 Urban Water Management Plan Update.

Modeling Assumptions for the City of Benicia UWMP Water Supply Assessment

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DATE: October 23, 2005

I. Introduction

This memorandum presents the modeling assumptions proposed for use in assessing the City of Benicia's State Water Project (SWP) water supply reliability. This analysis will address the expected reliability of the water to be provided to the City in accordance with 1) Table A entitlement supplies as proposed in the modified SWP Delivery Reliability Report, and 2) the *Settlement Agreement Among the Department of Water Resources(DWR) of the State of California, Solano County Water Agency, and Cities of Fairfield, Vacaville, and Benicia for Purposes of Water Supply*, dated May 19, 2003. This water is referred to as "Settlement Water".

The analysis will be consistent with studies supporting (1) the *Agreement for Conveying Settlement Water Through the North Bay Aqueduct by the Department of Water Resources to the Solano County Water Agency for the Cities of Fairfield, Vacaville, and Benicia*, dated May 19, 2003; (2) the *Agreement Regarding Priorities for Non-Project Water Transported through the North Bay Aqueduct by and between the Solano County Water Agency and the Cities of Fairfield, Benicia, Vallejo, and Vacaville*, dated March 18, 2003; and, (3) the *"Supplemental Analysis in Support of the City of Vacaville SB 610 Water Supply Assessment"*, dated January 9, 2004.

The expected reliability of Benicia's water supplies will be assessed using SOLANO_SIM, a planning simulation model developed for the Draft Environmental Impact Report (DEIR) for the *Cities of Fairfield, Vacaville, and Benicia Water Rights Appropriations Project* (2001). The model simulated the SWP's North Bay Aqueduct (NBA), the primary conveyance facility needed to serve the cities of Vacaville, Fairfield, and Benicia.

II. Model Assumptions

Model criteria can be separated into two main categories: 1) existing assumptions that are consistent with previous studies and common to Fairfield, Vacaville, and Benicia, and 2) new assumptions unique to this study.

1. Existing Assumptions Consistent With Previous Studies

The following water supply assumptions are common to the cities of Fairfield, Vacaville, and Benicia and have been used with SOLANO_SIM for previous water supply studies.

- Time step: All model inputs and outputs will be monthly.
- Study period: The model will analyze a 73-year period of record, from 1922 through 1994.
- Barker Slough Pumping Plant (BSPP) capacity: The physical capacity of the BSPP is 175 cubic feet per second (cfs)[1].
- Settlement Water deliveries: Settlement water is delivered through any excess BSPP and NBA simulated conveyance capacities, which is shared in proportion to the maximum settlement amount (Vacaville/Fairfield/Benicia - 9.32/11.80/10.50). Excess capacity is computed monthly to determine the physical potential to deliver Settlement Water to each city. Simulations of delivery of settlement water considers all senior users of the NBA. Deliveries are not simulated if physical capacity of the NBA has been reached in any month.
- Settlement Water restrictions under Term 91: State Water Resources Control Board (SWRCB) Standard Term 91 applies to months when the Sacramento – San Joaquin River Delta (Delta) is in balanced conditions and the SWP and CVP are releasing water to meet minimum Delta flow and water quality standards.[2] Since Settlement Water is not available to the City of Benicia when Term 91 is in effect, SOLANO_SIM restricts use of that source during those months.
- Monthly peak SWP deliveries: The simulation model will use the contract provision limiting SWP deliveries in a single month to 11% of the SWP contract total. This delivery provision is critical to evaluating the overall water supply reliability for Benicia.

2. New Assumptions Unique to This Study

The following water supply assumptions are unique to the water supply assessment for the City of Benicia's UWMP.

- Buildout demand: The maximum target demand for the City of Benicia is 13,527 acre-feet per year.[3] This value will be used to simulate all year types. Model runs will assume no city-mandated conservation measures will be in place during drought years.
- Demand pattern: Benicia's monthly demand pattern at buildout is described in Table 1. All non-Valero water is provided on a seasonal usage pattern, as described by the City of Benicia. The annual use ratio for a given month is used to determine Benicia's monthly water demand without accounting for deliveries to Valero. Valero's raw water

[1] The existing available capacity of the NBA may be less than that originally designed. Studies are underway to assess and address any capacity limitations. However, minor reductions in the capacity of the NBA are unlikely to affect the results of Benicia's water supply reliability study.

[2] Term 91 months were established in SWRCB Decision 1641.

[3] Year 2020 and beyond build-out demand provided by City of Benicia.

demand is assumed steady year-round. Projected deliveries to Valero are added to Benicia's demand each month to determine Benicia's total demand.

TABLE 1
City of Benicia – Monthly Average Demand Pattern at 2020 Buildout

	Oct	Nov	Dec	Jan[2]	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Annual use %[1]	8.92	6.42	6.25	6.00	5.67	6.00	7.50	9.17	11.17	11.67	11.25	10.00	100.00
Benicia	689	496	483	463	438	463	579	708	862	901	869	772	7,727
Valero	493	477	493	493	445	493	477	493	477	493	493	477	5,800
Total Demand (Ac-ft)	1,182	973	976	956	883	956	1,056	1,201	1,3397	1,394	1,362	1,249	13,527
Total % Distribution	8.74	7.19	7.22	7.07	6.53	7.07	7.81	8.88	9.90	10.31	10.07	9.23	100.00

Source: City of Benicia

- SWP Table A water supplies: The NBA will be simulated to deliver SWP Table A entitlement water to areas in Solano and Napa County, including Solano County Water Agency (purveyor to Vacaville, Fairfield, and Benicia), the Cities of Vallejo and Napa, and other contractors. Simulated Table A deliveries for the 73-year period of record will be derived from updated CALSIM II results.

  DWR is preparing an update to the SWP Delivery Reliability Report which was issued in 2003. While the 2005 Draft Report will not be available in final form until September 2005, DWR has released preliminary results regarding simulated annual deliveries. Simulated monthly NBA deliveries will be determined by using the previous study's monthly NBA values to prorate the new annual values on a monthly basis. It is expected that any differences, if any, to final monthly NBA deliveries will be minor.

III. Analysis

Output will be presented as available Settlement Water on an annual basis over the 73-year study period. Model results will be summarized on a monthly basis for 1) a single normal year, 2) a single-dry year, and 3) multiple-dry years to conform to Water Code section 10631. In this analysis, the Sacramento River Basin 40/30/30 Index[4] will be used to identify year types over the 73-year study period. Based on the City of Benicia's definitions for normal year, single-dry year, and multiple-dry years, SWP Table A entitlements (see Attachment 1) will be averaged to determine Benicia deliveries. To be consistent with the City of Benicia Urban Water Management Plan Update, the following definitions will be used:

Normal year: Delivery calculated based on an average of all SWP Table A entitlements in year types 2 and 3 (above normal and below normal) over the 73-year study period.

[4] CALSIM II Model Studies for SWP Delivery Capability Report, May 17, 2002; and DWR Notice to State Water Project Contractors, May 25, 2005.

Single-dry year: Delivery calculated based on an average of all SWP Table A entitlements in year types 4 and 5 (solitary dry/critical dry year or the first year of multiple dry/critical dry years.)

Multiple-dry years: Delivery calculated based on an average all SWP Table A entitlements in year types 4 and 5 for four consecutive years.

Attachment 1: SWP Water Supply Availability

Table created for the City of Vacaville and provided to CH2M HILL by the City of Benicia.

STATE WATER PROJECT WATER SUPPLY AVAILABILITY

July 20, 2005

SWP M&I Allocations

TABLE DEVELOPMENT

The following table is based on the DWR CALSIM II Model Studies for State Water Project Delivery Capability and the Notice to State Water Project Contractors, May 25, 2005, using the City of Vacaville's definitions for normal year, single dry year, and multiple dry years. (Reference notes (2), (3), and (4) below).

A. The Sacramento Valley 40/30/30 Index is used to identify yeartypes.

B. Based on definitions for normal, single dry, and multiple dry year conditions, as outlined in the City's adpoted Urban Water Mgmt Plan, entitlement figures are placed in the corresponding columns for each defined year condition. Figures for wet years (Value 1) are omitted.

C. The columns are averaged to obtain a reliable percentage of available water supply under each of the stated conditions.

Sacramento Valley 40/30/30/ Index

Value	Yeartype
1	Wet
2	Above Normal
3	Below Normal
4	Dry
5	Critical Dry

Year	Sacramento Valley 40/30/30 Index (1)	2020 Level of Development Full Table A (1)	2020 Full Entitlement Numbers for Normal Year (2)	2020 Full Entitlement Numbers for Single Dry Year (3)	2020 Full Entitlement Numbers for Multiple Dry Years (4)
1922	2	1.00	1.00		
1923	3	1.00	1.00		
1924	5	0.09		0.09	
1925	4	0.36			
1926	4	0.66			
1927	1	1.00			
1928	2	0.82	0.82		
1929	5	0.27		0.27	0.27
1930	4	0.66			0.66
1931	5	0.26			0.26
1932	4	0.38			0.38
1933	5	0.32			
1934	5	0.36			
1935	3	0.98	0.98		
1936	3	0.90	0.90		
1937	3	0.82	0.82		
1938	1	1.00			
1939	4	0.83		0.83	
1940	2	1.00	1.00		
1941	1	0.95			
1942	1	1.00			
1943	1	0.92			
1944	4	0.86		0.86	
1945	3	0.94	0.94		
1946	3	0.93	0.93		
1947	4	0.67		0.67	
1948	3	0.71	0.71		
1949	4	0.49		0.49	
1950	3	0.82	0.82		
1951	2	1.00	1.00		
1952	1	0.95			
1953	1	1.00			
1954	2	1.00	1.00		
1955	4	0.36		0.36	
1956	1	1.00			
1957	2	0.86	0.86		

1958	1	1.00			
1959	3	0.92	0.92		
1960	4	0.39		0.39	
1961	4	0.66			
1962	3	0.80	0.80		
1963	1	1.00			
1964	4	0.70		0.70	
1965	1	0.84			
1966	3	1.00	1.00		
1967	1	1.00			
1968	3	0.82	0.82		
1969	1	0.95			
1970	1	1.00			
1971	1	1.00			
1972	3	0.66	0.66		
1973	2	0.98	0.98		
1974	1	1.00			
1975	1	1.00			
1976	5	0.76		0.76	
1977	5	0.05			
1978	2	0.94	0.94		
1979	3	0.91	0.91		
1980	2	0.85	0.85		
1981	4	0.92		0.92	
1982	1	1.00			
1983	1	0.95			
1984	1	1.00			
1985	4	0.83		0.83	
1986	1	0.69			
1987	4	0.80		0.80	0.80
1988	5	0.10			0.10
1989	4	0.85			0.85
1990	5	0.21			0.21
1991	5	0.21			
1992	5	0.35			
1993	2	1.00	1.00		
		Average	0.90	0.61	0.44

Source: City of Vacaville, Utilities Division

(1) Source: CALSIM II Model Studies for SWP Delivery Capability Report, May 17, 2002; and DWR Notice to State Water Project Contractors, May 25, 2005.

(2) Normal delivery calculated based on average of yeartypes 2 & 3, above normal and below normal.

(3) Single dry year delivery calculated based on average of yeartypes 4 & 5, solitary dry/critical dry year or the first year of multiple dry/critical dry years.

(4) Multiple dry delivery calculated based on average of yeartypes 4 & 5 for four (4) consecutive years. This is consistent with the City of Vacaville 2000 Urban Water Management Plan Update.

Appendix G

Solano Project Reliability Estimates (SCWA)

Appendix C Solano Project Reliability

Ultimate level of development-of Lake Berryessa watershed @ 30,000 AF/yr - 2009 Study

Lake Berryessa Index

Value	Year Type
W	Wet
N	Below Normal
N	Above Normal
D	Dry
D	Critically Dry

Year	Index Value	% Full Alloc	% Full Alloc for Normal Year (N)	% Full Alloc for Single Dry Year (D) *	% Full Alloc for Multiple Dry Years (3 or more Dry years)
1906	W	100%			
1907	W	100%			
1908	D	100%		100%	
1909	W	100%			
1910	N	100%	100%		
1911	W	100%			
1912	D	100%		100%	
1913	D	100%			
1914	W	100%			
1915	W	100%			
1916	W	100%			
1917	N	100%	100%		
1918	D	100%		100%	
1919	N	100%	100%		
1920	D	100%		100%	
1921	N	100%	100%		
1922	N	100%	100%		
1923	N	100%	100%		
1924	D	95%		95%	
1925	N	95%	95%		
1926	N	95%	95%		
1927	W	95%			
1928	N	100%	100%		
1929	D	95%		95%	
1930	N	95%	95%		
1931	D	100%		100%	100%
1932	D	100%			100%
1933	D	45%			45%
1934	D	45%			45%
1935	N	100%	100%		
1936	N	100%	100%		
1937	N	100%	100%		
1938	W	100%			
1939	D	95%		95%	

1940	W	100%			
1941	W	100%			
1942	W	100%			
1943	N	100%	100%		
1944	D	100%		100%	
1945	N	100%	100%		
1946	N	100%	100%		
1947	D	100%		100%	100%
1948	D	95%			95%
1949	D	95%			95%
1950	D	95%			95%
1951	N	95%	95%		
1952	W	100%			
1953	N	100%	100%		
1954	N	100%	100%		
1955	D	95%		95%	
1956	W	100%			
1957	D	100%		100%	
1958	W	100%			
1959	D	100%		100%	
1960	N	100%	100%		
1961	D	100%		100%	
1962	N	100%	100%		
1963	W	100%			
1964	D	100%		100%	
1965	W	100%			
1966	N	100%	100%		
1967	W	100%			
1968	N	100%	100%		
1969	W	100%			
1970	W	100%			
1971	N	100%	100%		
1972	D	100%		100%	
1973	W	100%			
1974	W	100%			
1975	N	100%	100%		
1976	D	100%		100%	
1977	D	100%			
1978	W	100%			
1979	N	100%	100%		
1980	W	100%			
1981	D	100%		100%	
1982	W	100%			
1983	W	100%			
1984	N	100%	100%		
1985	D	100%		100%	
1986	W	100%			
1987	D	100%		100%	100%
1988	D	100%			100%
1989	D	100%			100%
1990	D	95%			95%
1991	N	95%	95%		

1992	D	90%		90%	
1993	W	95%			
1994	D	95%		95%	
1995	W	100%			
1996	W	100%			
1997	W	100%			
1998	W	100%			
1999	N	100%	100%		
2000	N	100%	100%		
2001	D	100%		100%	
2002	N	100%	100%		
2003	N	100%	100%		
2003	W	100%			
2004	N	100%	100%		
2005	N	100%	100%		
2006	W	100%			
2007		100%			
	Average	98%	99%	98%	89%

*Includes first year of consecutive dry years

Appendix H
Emergency Water Conservation Plan

Chapter 13.35
EMERGENCY WATER CONSERVATION PLAN

Sections:

13.35.010 Scope.
13.35.020 Declaration of policy.
13.35.030 Definitions.
13.35.040 Authorization.
13.35.050 Application.
13.35.060 Water conservation stages.
13.35.070 Mandatory conservation phase implementation.
13.35.080 Duration of conservation stages.
13.35.090 Drought penalty.
13.35.095 Drought surcharge.
13.35.100 Exceptions and application procedures for exceptions.
13.35.110 Violation – Enforcement.
13.35.120 Repealed.
13.35.130 Violation – Additional remedy.

13.35.010 Scope.
There is established a city emergency water conservation plan. (Ord. 90-19 N.S. § 1, 1990).

13.35.020 Declaration of policy.
It is declared that, because of the conditions prevailing in the city, the general welfare requires that the water resources available to the city be put to the maximum beneficial use to the extent to which they are capable, and that the waste or unreasonable use, or unreasonable method of use of water be prevented, and the conservation of such water is to be extended with a view to the reasonable and beneficial use thereof in the interests of the people of the city and for the public welfare. (Ord. 90-19 N.S. § 1, 1990).

13.35.030 Definitions.
A. "City" means the city of Benicia acting by and through the city of Benicia public works department as operator of the city of Benicia water system.

B. "Customer" means any person, whether within or without the geographic boundaries of the city of Benicia, who uses water supplied by the city.

C. "Director" means the director of public works of the city of Benicia.

D. "GPD" means gallons per day.

E. "HCF" means 100 cubic feet.

F. "Person" means any person, firm, partnership, association, corporation, company, organization, or governmental entity. (Ord. 90-19 N.S. § 1, 1990).

13.35.040 Authorization.
The city manager or his designate, upon the recommendation of the director, is authorized and directed to implement the applicable provisions of this chapter upon their determination

that such implementation is necessary to protect the public welfare and safety. (Ord. 90-19 N.S. § 1, 1990).

13.35.050 Application.
The provisions of this chapter shall apply to all persons, customers, and property served by the city. (Ord. 90-19 N.S. § 1, 1990).

13.35.060 Water conservation stages.
No customer of the city shall knowingly make, cause, use, or permit the use of water from the city for residential, commercial, industrial, agricultural, governmental, or any other purpose in a manner contrary to any provision of this chapter, or in an amount in excess of that use permitted by the conservation stage in effect pursuant to action taken by the city manager, or his designate, in accordance with the provisions of this chapter.

A. Stage 1. Voluntary Conservation.

1. Customers of the city are requested to voluntarily limit the amount of water used to that amount absolutely necessary for health, business, and irrigation.

2. In addition to the voluntary water use reductions of subsection (A)(1) of this section, and in compliance with BMC 13.35.070, the following restrictions shall apply to all persons:

a. The following uses of water are defined as "waste of water" and are absolutely prohibited:

i. Allowing water to run off to a gutter, ditch, or drain;

ii. Failing to repair a controllable leak;

iii. Washing sidewalks, driveways, parking areas, tennis courts, patios, or other paved areas, unless the concrete foundation is in the process of curing during construction, and except to alleviate immediate fire hazards.

B. Stage 2. Mandatory Compliance – Water Alert.

1. No residential customer shall make, cause, use, or commence the use of water received from the city for any purpose in an amount in excess of 350 gpd (2,800 cubic feet per 60-day billing cycle) per residence. Water used in excess of this amount shall be subject to a drought penalty as set forth in BMC 13.35.090. The customer of record may request an increase in the basic allotment as set forth in BMC 13.35.100.

2. No industrial or commercial customer shall make, cause, use, or permit the use of water received for any purpose in an amount in excess of 95 percent of the amount used during the base period defined as the amount of water used on a customer's premises during the corresponding bimonthly billing period in the base year of 1989. In addition to the above allotment, for meters that strictly serve landscaping the allotment shall be 75 percent of the amount used during the base period defined above. New services or services without 1989 history shall be allotted on comparable customer usage.

Water used in excess of this amount shall be subject to a drought penalty as set forth in BMC 13.35.090. The customer of record may request an increase in the basic allotment as set forth in BMC 13.35.100.

3. In addition to the above mandatory water use reductions of subsections (B)(1) and (2) of this section, and in compliance with BMC 13.35.070, the following restrictions shall apply to all persons:

a. Use of water from hydrants shall be limited to fire fighting and other activities necessary to maintain the health, safety, and welfare of the citizens of Benicia.

b. All "waste of water" elements as defined in Stage 1 shall remain in effect in Stage 2.

C. Stage 3. Mandatory Compliance – Water Warning.

1. No residential customer shall make, cause, use, or commence the use of water received from the city for any purpose in an amount in excess of 320 gpd (2,600 cubic feet per billing cycle) per residence. Water used in excess of this amount shall be subject to a drought penalty as set forth in BMC 13.35.090. The customer of record may request an increase in the basic allotment as set forth in BMC 13.35.100.

2. No industrial or commercial customer shall make, cause, use, or permit the use of water received for any purpose in an amount in excess of 90 percent of the amount used during the base period defined as the amount of water used on a customer's premises during the corresponding bimonthly billing period in the base year of 1989. In addition to the above allotment, for meters that strictly serve landscaping the allotment shall be 75 percent of the amount used during the base period defined above. New services or services without 1989 history shall be allotted on comparable customer usage.

Water used in excess of this amount shall be subject to a drought penalty as set forth in BMC 13.35.090. The customer of record may request an increase in the basic allotment as set forth in BMC 13.35.100.

3. In addition to the mandatory water use reductions of subsections (C)(1) and (2) of this section, and in compliance with BMC 13.35.070, all elements of Stage 2 shall remain in effect in Stage 3.

D. Stage 4. Mandatory Compliance – Water Emergency.

1. No residential customer shall make, cause, or commence the use of water received from the city for any purpose in an amount in excess of 295 gpd (2,400 cubic feet per billing cycle) per residence. Water used in excess of this amount shall be subject to a drought penalty as set forth in BMC 13.35.090. The customer of record may request an increase in the basic allotment as set forth in BMC 13.35.100.

2. No industrial or commercial customer shall make, cause, use, or permit the use of water received for any purpose in an amount in excess of 85 percent of the amount used during the base period defined as the amount of water used on a customer's premises during the corresponding bimonthly billing period in the base year of 1989. In

addition to the above allotment, for meters that strictly serve landscaping the allotment shall be 75 percent of the amount used during the base period defined above. New services or services without 1989 history shall be allotted on comparable customer usage.

Water used in excess of this amount shall be subject to a drought penalty as set forth in BMC 13.35.090. The customer of record may request an increase in the basic allotment as set forth in BMC 13.35.100.

3. In addition to the mandatory water use reductions of subsections (D)(1) and (2) of this section, and in compliance with BMC 13.35.070, all elements of Stage 3 shall remain in effect in Stage 4.

E. Stage 5. Mandatory Compliance – Water Crisis.

1. No residential customer shall make, cause, use, or commence the use of water received from the city for any purpose in an amount in excess of 230 gpd (1,900 cubic feet per billing cycle) per residence. Water used in excess of this amount shall be subject to a drought penalty as set forth in BMC 13.35.090. The customer of record may request an increase in the basic allotment as set forth in BMC 13.35.100.

2. No industrial or commercial customer shall make, cause, use, or permit the use of water received for any purpose in an amount in excess of 71 percent of the amount used during the base period defined as the amount of water used on a customer's premises during the corresponding bimonthly billing period in the base year of 1989. In addition to the above allotment, for meters that strictly serve landscaping, the allotment shall be 50 percent of the amount used during the base period defined above. New services or services without 1989 history shall be allotted on comparable customer usage.

Water used in excess of this amount shall be subject to a drought penalty as set forth in BMC 13.35.090. The customer of record may request an increase in the basic allotment as set forth in BMC 13.35.100.

3. In addition to the mandatory water use reductions of subsections (E)(1) and (2) of this section, and in compliance with BMC 13.35.070, all elements of Stage 4 shall remain in effect in Stage 5 except that:

a. BMC 13.35.100(A) does not apply in this stage. The customer of record may still apply for exceptions as outlined in BMC 13.35.100, but the reason for applying for an exception cannot be based on economic hardship. (Ord. 91-5 N.S. §§ 1, 3, 1991; Ord. 91-2 N.S. §§ 1, 2, 1991; Ord. 90-19 N.S. § 1, 1990).

13.35.070 Mandatory conservation phase implementation.

A. The department of public works shall monitor the projected supply and demand for water by its customers and shall recommend to the city manager the extent of the conservation required in order for the department to prudently plan for and supply water to its customers. Thereafter, the city manager may order that the appropriate phase of water conservation be implemented in accordance with the applicable provisions of this section. Said order shall be made by public announcement and shall be published a minimum of one time in a daily

newspaper of general circulation and shall continue to be published on a weekly basis until such time as all restrictions are removed. Said order shall become effective immediately upon the first publication.

B. Conservation Stages. The various stages of water conservation shall be implemented upon authorization by the city manager. (Ord. 91-5 N.S. § 2, 1991; Ord 91-2 N.S. § 3, 1991; Ord. 90-19 N.S. § 1, 1990).

13.35.080 Duration of conservation stages.
Stage 1 shall be effective upon the effective date of the ordinance codified in this chapter, and the restrictive provisions of Stage 1 as set forth in BMC 13.35.060 shall apply to all water consumption on and after said date. Stage 1 will be rescinded at such time that conditions, as set forth in BMC 13.35.070, indicate a more restrictive stage is necessary. (Ord. 90-19 N.S. § 1, 1990).

13.35.090 Drought penalty.
A. Customers will receive prior individual notification of the standard allotment basis, applicable rates, and the opportunity to request exceptions to the standard allotment basis.

B. Water use beyond the maximum allowed for each water conservation stage shall be subject to a drought penalty pursuant to the schedule set forth in subsection (C) of this section. The customer of record may request an increase in this basic allotment as set forth in BMC 13.35.100. Application forms and instructions will be provided to customers and will also be available at the city water billing office.

C. In addition to the general water service rates, each customer shall pay, during each billing period, a drought penalty for water delivered in excess of the water allotment. The drought penalty is as follows:

For water delivered up to 10 percent in excess of allotment there shall be a drought penalty equal to 2.0 times the applicable volume charge, in addition to the applicable service charge and volume charge;

For water delivered from 10.01 percent to 20 percent in excess of allotment there shall be a drought penalty of 3.0 times the applicable volume charge levied on this excess only, in addition to the drought penalty on the first 10 percent and the applicable service charge and volume charge; and

For water delivered over 20 percent in excess of allotment, there shall be a drought penalty of 4.0 times the applicable volume charge levied only on this excess over 20 percent, in addition to the drought penalties on the first 20 percent and the applicable service charge and volume charge.

D. In addition to the drought penalty, if drought usage exceeds the allowed allotment, a warning will be issued and enforcement actions may be taken as described in BMC 13.35.110. (Ord. 91-5 N.S. § 4, 1991; Ord. 91-2 N.S. § 1, 1991; Ord. 90-19 N.S. § 1, 1990).

13.35.095 Drought surcharge.
A. A drought surcharge may be imposed by the city council, upon the recommendation of the finance director, to compensate for a loss of water revenue or to pay an additional cost for the purchase of water by the city.

B. The drought surcharge is a monthly charge and is as follows:

Residential (Non-Seniors)	$ 4.25
Residential (Seniors)	0
Commercial/Industrial (Meter Size):	
3/4 inch	$ 4.25
1	7.55
1 1/2	17.00
2	30.20
Commercial/Industrial (Meter Size):	
3 inch	$ 67.95
4	120.80
6	271.75

C. The drought surcharge will be in effect beginning May 1, 1991, and will continue until May 31, 1993, or upon report of the finance director stating that the water emergency costs have been fully recovered by the surcharge, whichever occurs first. By resolution, the city council may extend imposing the surcharge beyond May 31, 1993, upon recommendation of the finance director. (Ord. 91-5 N.S. § 5, 1991; Ord. 91-2 N.S. § 5, 1991; Ord. 90-19 N.S. § 1, 1990).

13.35.100 Exceptions and application procedures for exceptions.

A. Any customer of record may apply to the director to increase the amount of water which may be used without exceeding the basic allotment based on any one or more of the following reasons:

1. Medical requirements;

2. More than four residents in a single-family residential household. The additional amount allotted shall be 50 gpd per person;

3. Incorrect customer classification based on predominant use;

4. When failure to do so would cause severe economic hardship to the applicant, including, but not limited to, threat of imminent insolvency;

5. When failure to do so would cause an emergency condition affecting the health, sanitation, fire protection, or safety of the applicant or the public.

B. Written applications for such exceptions may be granted by the director based upon clear and convincing evidence that any one or more of the foregoing conditions has been satisfied and it is in the public interest to grant such application.

C. The quantity of water allowed in addition to the basic allotment shall be determined by the director, and shall not exceed that quantity necessary to alleviate the condition which justified granting the application for an exception. (Ord. 91-2 § 4, 1991; Ord. 90-19 N.S. § 1,

1990).

13.35.110 Violation – Enforcement.
The violation of each provision of this chapter, and each separate violation thereof, shall be deemed a separate offense and shall be enforced accordingly.

A. Except for the imposition of the drought penalty as a condition of enforcement of any violation of this chapter, any customer that violates any provision of this chapter shall be given a written warning or notice to refrain from further violations.

A written warning or notice shall be given to the violator either by mailing said warning or notice to the address given to the city by the customer of record, by personal service on the violator, or by leaving said warning or notice in a conspicuous place on the served property wherein the violation occurred.

B. If, after issuance of the written warning or warnings, the director determines that the customer has continued or is continuing to violate the provisions of this chapter, the director may authorize and implement installation of a flow-restricting device on the service line or reduce the amount of water available to the customer. Any costs incurred by the city to authorize, implement, and remove the installation of a flow-restricting device on the service line or reduce the amount of water available to the customer shall be borne by the customer. The flow-restricting device shall be removed and the prior water supply amount resumed no sooner than 60 days after the date of the installation of the flow-restricting device or a reduction in water available; provided, that no further violations have occurred within that time.

C. If after implementation of a flow-restricting device or reduction of water available to a customer, the customer continues to violate the provisions of the chapter, the director may authorize disconnection of water service to the customer for a period of three days. All costs or expenses incurred by the city for enforcement of this section shall be borne by the customer. (Ord. 91-5 N.S. § 6, 1991; Ord. 90-19 N.S. § 1, 1990).

13.35.120 Violation – Penalties.
Repealed by Ord. 03-9. (Ord. 90-19 N.S. § 1, 1990).

13.35.130 Violation – Additional remedy.
As an additional remedy, the violation of any provision of this chapter by any person who has received more than one written warning pursuant to BMC 13.35.110 to refrain from the same or any other violation under this chapter in one calendar year shall be deemed, and is declared to be, a public nuisance and may be subject to abatement by a restraining order or injunction issued by a court of competent jurisdiction. (Ord. 90-19 N.S. § 1, 1990).

This page of the Benicia Municipal Code is current through Ordinance 10-02, passed August 17, 2010.

Disclaimer: The City Clerk's Office has the official version of the Benicia Municipal Code. Users should contact the City Clerk's Office for ordinances passed subsequent to the ordinance cited above.

City Website: http://www.ci.benicia.ca.us/ (http://www.ci.benicia.ca.us/)
City Telephone: (707) 746-4201
Code Publishing Company (http://www.codepublishing.com/)

Appendix I

2009/2010 CUWCC Best Management Practices Reports

I-1 CUWCC BMP Coverage Reports

CUWCC BMP RETAIL COVERAGE REPORT 2009-2010

Foundation Best Management Practices for Urban Water Efficiency

Agency: City of Benicia **District Name:** City of Benicia **CUWCC Unit #:** 6291
Retail

Primary Contact David Wenslawski **Telephone** 707-746-4792 **Email:** DavidW@ci.benicia.ca.us

Compliance Option Chosen By Reporting Agency:
(Traditional, Flex Track or GPCD)
GPCD if used:

GPCD in 2010	**175**
GPCD Target for 2018	159

Year	Report	Target		Highest Acceptable Bound	
		% Base	GPCD	% Base	GPCD
2010	1	96.4%	186	100%	193
2012	2	92.8%	180	96%	186
2014	3	89.2%	173	93%	180
2016	4	85.6%	166	89%	173
2018	5	82.0%	159	82%	159

Not on Track if 2010 GPCD is > than target

GPCD in 2010	175
Highest Acceptable GPCD for 2010	193

On Track

Agency: City of Benicia **District Name:** City of Benicia **CUWCC Unit #:** 6291
Retail

CUWCC BMP RETAIL COVERAGE REPORT 2009-2010

Foundation Best Management Practices for Urban Water Efficiency

Foundational BMPs

BMP 1.1 Operational Practices

Conservation Coordinator provided with necessary resources to implement BMPs?

		2009	2010
1.Conservation Coordinator provided with necessary resources to implement BMPs?	Name	David Wenslawski	David Wenslawski
	Title	Water Quality technician	Water Quality Technician
	Email		davidw@ci.benici
		On Track	On Track

On Track if any one of the 6 ordinance actions done, plus documentation or links provided

	2009	2010
2. Water waste prevention documentation		
Descriptive File		
Descriptive File 2010		
URL	www.ci.benicia.ca.us and tab for municipal code; Go to title 13	
URL 2010		
Describe Ordinance Terms		
Describe Ordinance Terms 2010		www.ci.benicia.ca.us and tab for municipal code; Go to title 13 chapter 13.35 to see the emergency water conservation plan.
	On Track	On Track

Agency: City of Benicia | District Name: City of Benicia | CUWCC Unit #: 6291

Retail

CUWCC BMP RETAIL COVERAGE REPORT 2009-2010

Foundation Best Management Practices for Urban Water Efficiency

BMP 1.2 Water Loss Control

	2009		
Complete a prescreening Audit	yes	On Track	On Track if Yes
Metered Sales	4,517		
Verifiable Other Uses	0		
Total Supply	5,777		
(Metered Sales + System uses)/ Total Supply >0.89	0.78		On Track if =>.89, Not on Track if No
If ratio is less than 0.9, complete a full scale Audit in 2009?	Yes	On Track	On Track if Yes
Verify Data with Records on File?	Yes	On Track	On Track if Yes
Operate a system Leak Detection Program?	Yes	On Track	On Track if Yes

	2010		
Compile Standard Water Audit using AWWA Software?	Yes	On Track	On Track if Yes, Not on Track if No
AWWA file provided to CUWCC?	no	On Track	On Track if Yes, Not on Track if No
AWWA Water Audit Validity Score?	56		Info only until 2012
Completed Training in AWWA Audit Method?	yes		
Completed Training in Component Analysis Process?	Yes		Info only until 2012
Complete Component Analysis?	No		Info only until 2012
Repaired all leaks and breaks to the extent cost effective?	Yes	On Track	On Track if Yes, Not on Track if No
Locate and repair unreported leaks to the extent cost effective.	Yes	On Track	On Track if Yes, Not on Track if No
Maintain a record-keeping system for the repair of reported leaks, including time of report, leak location, type of leaking pipe segment or fitting, and leak running time from report to repair.			Info only until 2012

Provided 7 types of Water Loss Control Info

Info only until 2012

Leaks Repaired	Value Real Losses	Value Apparent Losses	Miles Surveyed	Press Reduction	Cost of Interventions	Water Saved
107	$ 39,705	$ 240,696		Yes	$ -	

Agency: City of Benicia | District Name: City of Benicia | CUWCC Unit #: 6291

Retail

CUWCC BMP RETAIL COVERAGE REPORT 2009-2010

Foundation Best Management Practices for Urban Water Efficiency

1.3 METERING WITH COMMODITY RATES FOR ALL NEW CONNECTIONS AND RETROFIT OF EXISTING CONNECTIONS

		2009		2010		
Exemption or 'At least as Effective As' accepted by CUWCC						If signed MOU prior to 31 Dec 1997, On Track if all connections metered; If signed after 31 Dec 1997, complete meter installations by 1 July 2012 or within 6 yrs of signing and 20% biannual reduction of unmetered connections.
Numbered Unmetered Accounts	2008	0	On Track	0	On Track	On Track if no unmetered accounts
Metered Accounts billed by volume of use		Yes	On Track	Yes	On Track	Volumetric billing required for all connections on same schedule as metering
Number of CII accounts with Mixed Use meters						Info only
Conducted a feasibility study to assess merits of a program to provide incentives to switch mixed-use accounts to dedicated landscape meters?		No		No		Required by 2012
Feasibility Study provided to CUWCC?		Yes	On Track	No	On Track	On Track if Yes, Not on Track if No
Completed a written plan, policy or program to test, repair and replace meters		Yes	On Track	Yes	On Track	On Track if Yes, Not on Track if No

CUWCC BMP RETAIL COVERAGE REPORT 2009-2010

Foundation Best Management Practices for Urban Water Efficiency

Agency: City of Benicia **District Name:** City of Benicia **CUWCC Unit #:** 6291
Retail
Coverage Report Date: June 6, 2011

Primary Contact David Wenslawski **Email:** davidw@ci.benicia.ca.us

1.4 Retail Conservation Pricing

Date 2009 data received June 1, 2011
Date 2010 data received June 1, 2011

On Track if: Increasing Block, Uniform, Allocation, Standby Service; Not on Track if otherwise

Metered Water Rate Structure

Customer Class	2009 Rate Type	Conserving Rate?	Customer Class	2010 Rate Type	Conserving Rate?
Single-Family	Increasing Block	Yes	Single-Family	Increasing Block	Yes
Multi-Family	Increasing Block	Yes	Multi-Family	Increasing Block	Yes
Commercial	Increasing Block	Yes	Commercial	Increasing Block	Yes
Industrial	Increasing Block	Yes	Institutional	Increasing Block	Yes
Institutional	Increasing Block	Yes	Industrial	Increasing Block	Yes
	On Track			On Track	

Year Volumetric Rates began for Agencies with some Unmetered Accounts

Info only

Agencies with Partially Metered Service Areas: If signed MOU prior to 31 Dec. 1997, implementation starts no later than 1July 2010. If signed MOU after 31 Dec. 1997, implementation starts no later than 1July 2013, or within seven years of signing the MOU,

Agency: City of Benicia
Retail

District Name: City of Benicia

CUWCC Unit #: 6291
Coverage Report Date: June 6, 2011

CUWCC BMP RETAIL COVERAGE REPORT 2009-2010

Foundation Best Management Practices for Urban Water Efficiency

Adequacy of Volumetric Rates) for Agencies with No Unmetered Accounts

Customer Class	2009 Rate Type	2009 Volumetric Revenues $1000s	2010 Rate Type	2010 Volumetric Revenues $1000s
Single-Family	Increasing Block	$ 1,787	Single-Family	$ 1,306
Multi-Family	Increasing Block	$ 351	Multi-Family	$ 271
Commercial	Increasing Block	$ 741	Commercial	$ 516
Industrial	Increasing Block	$ 101	Institutional	$ 279
Institutional	Increasing Block	$ 342	Industrial	$ 83
		$ -		$ 29
		$ -		$ -
Total Revenue Commodity Charges (V):		$ 3,321		$ 2,484
Total Revenue Fixed Charges (M):		$ 2,178		$ 2,201
Calculate: V / (V + M):		60%		53%
		On Track		On Track

Agency Choices for rates:

A) Agencies signing MOU prior to 13 June2007, implementation starts 1 July2007: On Track if (V / (V + M) ≥ 70% x .8 = **56% for 2009** and 70%x0.90 = **63% for 2010**; Not on track if (V / (V + M)) < 70%;

B) Use Canadian model.

Agencies signing MOU after 13June2007, implementation starts July 1 of year following signing.

	2009	2010
Canadian Water & Wastewater Rate Design Model Used and Provided to CUWCC	No	No
If Canadian Model is used, was 1 year or 3 year period applied?		

Wastewater Rates

	2009	2010
Does Agency Provide Sewer Service?	Yes	Yes

If 'No', then wastewater rate info not required.

Customer Class	2009 Rate Type	Conserving Rate?	Customer Class	2010 Rate Type	Conserving Rate?
Single-Family	Uniform	Yes	Single-Family	Uniform	Yes
Multi-Family	Uniform	Yes	Multi-Family	Uniform	Yes
Commercial	Increasing Block	Yes	Other	Uniform	Yes
Other	Uniform	Yes	Other	Uniform	Yes
Other	Uniform	Yes	Commercial	Increasing Block	Yes
Institutional	Increasing Block	Yes	Institutional	Increasing Block	Yes
		On Track			On Track

On Track if: 'Increasing Block', 'Uniform', 'based on long term marginal cost' or 'next unit of capacity'

CUWCC BMP RETAIL COVERAGE REPORT 2009-2010

Foundation Best Management Practices for Urban Water Efficiency

BMP 2. EDUCATION PROGRAMS

BMP 2.1 Public Outreach Actions Implemented and Reported to CUWCC

	2009	2010
1) Contacts with the public (minimum = 4 times per year)	4	6
2) Water supplier contacts with media (minimum = 4 times per year, i.e., at least quarterly).	By Solano CWA	By Solano CWA
3) An actively maintained website that is updated regularly (minimum = 4 times per year, i.e., at least quarterly).	Yes	Yes
4) Description of materials used to meet minimum requirement.	Website General water conservation information	Website General water conservation information
5) Annual budget for public outreach program.	$ 6,000	$ 6,000
6) Description of all other outreach programs	Description is too large for text area. Data will be stored in the BMP Reporting database when online.	Description is too large for text area. Data will be stored in the BMP Reporting database when online.
	On Track	**On Track**

All 6 action types implemented and reported to CUWCC to be 'On Track')

CUWCC BMP RETAIL COVERAGE REPORT 2009-2010

Foundation Best Management Practices for Urban Water Efficiency

2.2 School Education Programs Implemented and Reported to CUWCC

	2009	2010	
Does a wholesale agency implement School Education Programs for this unility's benefit?	No	No	
Name of Wholesale Supplier?			
1) Curriculum materials developed and/or provided by agency	Topo map of delta, replica of San Francisco bay, wetland plants, posters and game cards of microorganisms, water quality testing supplies, microscopes, water cycle poster, rainfall graphs, water use timeline, DWR California water use handout, albatross boluses, and calculators.	Topo map of delta, replica of San Francisco bay, wetland plants, posters and game cards of microorganisms, water quality testing supplies, microscopes, water cycle poster, rainfall graphs, water use timeline, DWR California water use handout, albatross boluses, and calculators.	Yes/ No
2) Materials meet state education framework requirements and are grade-level appropriate?	yes	yes	All 5 actions types implemented and reported to CUWCC to be 'On Track'
3) Materials Distributed to K-6?	yes	yes	
Describe K-6 Materials	Botany safari Worksheet, Pollution Prevention workbook, Captain Hydro workbook, Bolus investigation data/lab sheet, garbage patch tracking sheet, water quality testing worksheet	Botany safari Worksheet, Pollution Prevention workbook, Captain Hydro workbook, Bolus investigation data/lab sheet, garbage patch tracking sheet, water quality testing worksheet	Describe materials to meet minimum requirements
Materials distributed to 7-12 students?	No	No	Info Only
4) Annual budget for school education program.	$ 20,000	$ 20,000	
5) Description of all other water supplier education programs	46 classroom presentations, 26 tours/field trips,	49 classroom presentations,4 large group presentations, Environmental Art contest offered to 3rd through 6th grades, 49 tours/field trips	
	On Track	On Track	

I-2 City of Benicia 2009 BMP Reports

The fields in red are required.

Agency name: City of Benicia

Reporting unit name (District name): City of Benicia

Reporting unit number: 6291

Primary contact:

First name: David

Last name: Wenslawski

Email: DavidW@ci.benicia.ca.us

You must enter the reporting unit numbe we have on record fo agency. Click here to open a table to obtain this number.

Submit Form

Link to FAQs

2009

BMP 1.1 Operations Practices

Comments:

See the complete MOU: View MOU

See the coverage requirements for this BMP:

Conservation Coordinator

Conservation Coordinator ◯ Yes ◯ No

Contact Information

First Name	David
Last Name	Wenslawski
Title	Water Quality technician
Phone	707-746-4792
Email	davidw@ci.benicia.ca.us

Note that the contact information may be the same as the primary contact information at the top of the page. If this is your case, excuse the inconvenience but please enter the information again.

Water Waste Prevention

Water Agency shall do one or more of the following:

a. Enact and enforce an ordinance or establish terms of service that prohibit water waste
b. Enact and enforce an ordinance or establish terms of service for water efficient design in new development
c. Support legislation or regulations that prohibit water waste
d. Enact an ordinance or establish terms of service to facilitate implementation of water shortage response measures
e. Support local ordinances that prohibit water waste
f. Support local ordinances that establish permits requirements for water efficient design in new

To document this BMP, provide the following:

a. A description of, or electronic link to, any ordinances or terms of service
b. A description of, or electronic link to, any ordinances or requirements adopted by local jurisdictions or regulatory agencies with the water agency's service area.
c. A description of any water agency efforts to cooperate with other entities in the adoption or enforcement of local requirement
d. description of agency support positions with respect to adoption of legislation or regulations

You can show your documentation by providing files, links (web addresses), and/or entering a description.

File name(s): Email files to natalie@cuwcc.org

Web address(s) URL: comma-separated list

Enter a description:

I'm not able to add a web link so I'll give direction on how to fine the ordinance online. Go to www.ci.benicia.ca.us and click on the tab for municipal code on the left. Go to title 13 chapter 13.35 to see the emergency water conservation plan.

The fields in red are required.

Agency name: City of Benicia

Reporting unit name (District name): City of Benicia

Reporting unit number: 6291

Primary contact:

First name: David

Last name: Wenslawski

Email: DavidW@ci.benicia.ca.us

You must enter the repo we h agency. Click here to open a table to obtain this number.

Submit Form

Link to FAQs

View MOU

2009 BMP 1.2 Water Loss Control

Did your agency complete a pre-screening system audit in 2009? Yes ◉ No ○

If yes, answer the following:

Determine metered sales in AF: 4,517.00

Definition: other accountable uses not included in metered sales, such as unbilled water use, fire suppression, etc.

Determine system verifiable uses AF: 0.00

Determine total supply into the system in AF: 5,777.00

Does your agency keep necessary data on file to verify the answers above? Yes ◉ No ○

Did your agency complete a full-scale system water audit during 2009? Yes ◉ No ○

Does your agency maintain in-house records of audit results or the completed AWWA worksheet for the completed audit which could be forwarded to CUWCC? Yes ◉ No ○

Did your agency operate a system leak detection program? Yes ○ No ◉

Comments:

version 1.0 2009

The fields in red are required.

Agency name: City of Benicia

Reporting unit name (District name): City of Benicia

Reporting unit number: 6291

Primary contact:

First name: David

Last name: Wenslawski

Email: DavidW@ci.benicia.ca.us

You must enter the reporting unit number

Submit Form

agency. Click here to open a table to obtain this number.

BMP 1.3 Metering with Commodity

Link to FAQs

See the complete MOU: View MOU

See the coverage requirements for this BMP:

Implementation

Does your agency have any unmetered service connections? Yes No

If YES, has your agency completed a meter retrofit plan? Yes No

Enter the number of previously unmetered accounts fitted with meters during reporting year: 0

Are all new service connections being metered? Yes No

Are all new service connections being billed volumetrically? Yes No

Has your agency completed and submitted electronically to the Council a written plan, policy or program to test, repair and replace meters? Yes No

Please Fill Out The Following Matrix

Account Type	# Metered Accounts	# Metered Accounts Read	# Metered Accounts Billed by Volume	Billing Frequency Per Year	# of estimated bills/yr
Single-Family	8,598	8,598	8,598	Bi-monthly	6
Multi-Family	306	306	306	Bi-monthly	6
Commericial	543	543	543	Bi-monthly	6
Industrial	79	79	79	Bi-monthly	6
Dedicated Irrigatic	279	279	279	Bi-monthly	6
Other	8	8	8	Bi-monthly	6
Other				Other	
Other				Other	
Other				Other	
Other				Other	

Number of CII Accounts with Mixed-use Meters

Number of CII Accounts with Mixed-use Meters Retrofitted with Dedicated Irrigation Meters during Reporting Period

Feasibility Study

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? Yes No

If YES, please fill in the following information:

A. When was the Feasiblity Study conducted

B. Email or provide a link to the feasibility study (or description of):

File name(s): Email files to natalie@cuwcc.org Enter the file name here e.g. WaterWastePreventionOrdinance

Web address(s) URL: comma-separated list Enter the URL to your documentation.

General Comments about BMP 1.3:

The fields in red are required.

Agency name: City of Benicia

Reporting unit name (District name): City of Benicia

Reporting unit number: 6291

Primary contact:

First name: David

Last name: Wenslawski

Email: DavidW@ci.benicia.ca.us

You must enter the reporting unit number that we have on record for your agency. Click here to open a table to obtain this number.

Link to FAQs

View MOU

BMP 1.4 Retail Conservation Pricing

2009

If you are reporting more rate structures than this form allows, add the structures to a spreadsheet and send the file to natalie@cuwcc.org.

Implementation (Water Rate Structure)

Enter the Water Rate Structures that are assigned to the majority of your customers, by customer class

Rate Structure	Customer Class	Total Revenue Commodity Charges	Total Revenue Customer Meter/Service (Fixed Charges)
Increasing Block	Single-Family	1,786,541.00	1,423,828.00
Increasing Block	Multi-Family	350,844.00	273,131.00
Increasing Block	Commercial	740,972.00	405,683.00
Increasing Block	Industrial	100,538.00	46,899.00
Increasing Block	Institutional	341,706.00	30,229.00
Increasing Block	Other		28,238.00
Select a Rate Struc	Select a Customer Ty		

Implementation Option (Conservation Pricing Option)

- ○ Use Annual Revenue As Reported
- ○ Use Canadian Water & Wastewater Association Rate Design Model

If CWWA is select, enter the file name and email the spreadsheet to natalie@cuwcc.org

Retail Waste Water (Sewer) Rate Structure by Customer Class

Agency Provide Sewer Service ○ Yes ○ No

Select the Retail Waste Water(Sewer) Rate Structure assigned to the majority of your customers within a specific customer class.

Rate Structure	Customer Class	Total Revenue Commodity Charges	Total Revenue Customer Meter/Service (Fixed Charges)
Uniform	Single-Family		4,092,660.59
Uniform	Multi-Family		1,240,649.88
Increasing Block	Commercial	1,025,927.97	
Uniform	Other		136,656.75
Uniform	Other		12,821.93
Increasing Block	Institutional	26,174.51	
Select a Rate Struc	Select a Customer Ty		

Comments:

The fields in red are required.

Agency name: City of Benicia

Reporting unit name (District name): City of Benicia

Reporting unit number: 6291

Primary contact:

First name: David

Last name: Wenslawski

Email: DavidW@ci.benicia.ca.us

Click here to open a table that displays your agency name, reporting unit name and reporting unit number. Please ensure that you enter the correct information.

Submit Form

Link to FAQs

2009

BMP 2.1 Public Outreach - Retail Reporting

View MOU

Is a Wholesale Agency Performing Public Outreach?

Are there one or more wholesale agencies performing public outreach which can be counted to help your agency comply with the BMP? ○ Yes ○ No

Enter the name(s) of the wholesale agency (comma delimited): Solano County Water Agency

Is your agency performing public outreach?

Report a minimum of 4 water conservation related contacts your agency had with the public during the year.

Public Information Programs List

Did at least one contact take place during each quarter of the reporting year? ☐

Number of Public Contacts	Public Information Programs
1	Flyers and/or brochures (total copies), bill stuffers, messages printed on bill, information packets
1	Website
2	General water conservation information
	Select a public contact
	Select a public contact

Contact with the Media

Are there one or more wholesale agencies performing media outreach which can be counted to help your agency comply with the BMP? ○ Yes ○ No

Enter the name(s) of the wholesale agency (comma delimited): solano county water agency

OR Retail Agency (Contacts with the Media)

Did at least one contact take place during each quarter of the reporting year? ☐

Media Contacts List

Number of Media Contacts	Did at least one contact take place during each quarter of the reporting year?	Media Contact Types
		Select a type of media contact
		Select a type of media contact
		Select a type of media contact
		Select a type of media contact
		Select a type of media contact
		Select a type of media contact

Is a Wholesale Agency Performing Website Updates?

Did one or more CUWCC wholesale agencies agree to assume your agency's responsibility for meeting the requirements of and for CUWCC reporting of this BMP? ○ Yes ○ No

Enter the name(s) of the wholesale agency (comma delimited)

solano county water agency

Is Your Agency Performing Website Updates?

Enter your agency's URL (website address): www.solanosaveswater.org

Describe a minimum of four water conservation related updates to your agency's website that took place during the year:

solano county water agency maintanes the website.

Did at least one Website Update take place during each quarter of the reporting year? ○ Yes ○ No

Public Outreach Annual Budget

Enter budget for public outreach programs. You may enter total budget in a single line or brake the budget into discrete categories by entering many rows. Please indicate if personnel costs are included in the entry.

Category	Amount		Personnel Costs Included? If yes, check the box.	Comments	
outreach	$6,000				

Comments:

The fields in red are required.

Agency name: City of Benicia

Reporting unit name (District name): City of Benicia

Reporting unit number: 6291

Primary contact:

First name: David

Last name: Wenslawski

Email: DavidW@ci.benicia.ca.us

Click here to open a table that displays your agenc reporting unit name reporting unit number. Please ensure that you enter the correct information.

Submit Form

Link to FAQs

2009

BMP 2.1 Public Outreach Cont'd

View MOU

Public Outreach Expenses

Enter expenses for public outreach programs. Please include the same kind of expenses you included in the question related to your budget (Section 2.1.7, above). For example, if you included personnel costs in the budget entered above, be sure to include them here as well.

Expense Category	Expense Amount	Personnel Costs Included?	
outreach	$5,000	☐	If yes, check the check box.
		☐	
		☐	
		☐	

Additional Public Information Program

Please report additional public information contacts. List these additional contacts in order of how your agency views their importance / effectiveness with respect to conserving water, with the most important/ effective listed first (where 1 = most important).

Were there additional Public Outreach efforts? ○ Yes ○ No

Public Outreach Additional Information

Public Information Programs	Importance
	$1
	$2
	$3

Social Marketing Programs

Branding

Does your agency have a water conservation "brand," "theme" or mascot? ○ Yes ○ No

Describe the brand, theme or mascot. Be Green Save Blue

Market Research

Have you sponsored or participated in market research to refine your message? ○ Yes ○ No

Market Research Topic

Brand Message

Brand Mission Statement

Community Committees

Do you have a community conservation committee? ○ Yes ○ No

Enter the names of the community committees: Solano County Urban Water Conservation Committee

Training

Training Type	# of Trainings	# of Attendees	Description of Other
Water Wise Landscapi	$3	$120	

Social Marketing Expenditures

Public Outreach Social Marketing Expenses

Expense Category	Expense Amount	Description
public education	5000	

Partnering Programs - Partners

Name	Type of Program
☐ CLCA?	
☐ Green Building Programs?	
☐ Master Gardeners?	water wise landscaping
☐ Cooperative Extension?	
☐ Local Colleges?	
☐ Other	

☐ Retail and wholesale outlet; name(s) and type(s) of programs:

Partnering Programs - Newsletters

Number of newsletters per year: 1

Number of customers per year	9813

Partnering with Other Utilities

Describe other utilities your agency partners with, including electrical utilities	Partner with Solano County Water Agency, City of Vallejo, City of Fairfield, City of Vacaville, Solano Irrigation District

Conservation Gardens

Describe water conservation gardens at your agency or other high traffic areas or new	Help sponser a water conservation garden at Six Flags Discovery Kindom with Solano County Water Agency and other water providers in Solano county.

Landscape contests or awards

Describe water wise landscape contest or awards program conducted by your agency	Conducted a water wise garden contest. Winner received $250 gift certificate.

Comments:

The fields in red are required.

Agency name: City of Benicia

Reporting unit name (District name): City of Benicia

Reporting unit number: 6291

Primary contact:

First name: David

Last name: Wenslawski

Email: DavidW@ci.benicia.ca.us

Click here to open a table that displays your agency n reporting unit name an reporting unit number. Please ensure that you enter the correct information.

Submit Form

Link to FAQs

2009

BMP 2.2 School Education Programs, Retail Agencies

View MOU

School Programs

Is a wholesale agency implementing school programs which can be counted to help your agency comply with this BMP? ○ Yes ○ No

Enter Wholesaler Names, separated by commas:

☐ Materials meet state education framework requirements?

Description of Materials: Topo map of delta, replica of San Francisco bay, wetland plants, posters and game cards of microorganisms, water quality testing supplies, microscopes, water cycle poster, rainfall graphs, water use timeline, DWR California water use handout, albatross boluses, and calculators.

☐ Materials distributed to K-6 Students?

Description of materials distributed to K-6 Students: Botany safari Worksheet, Pollution Prevention workbook, Captain Hydro workbook, Bolus investigation data/lab sheet, garbage patch tracking sheet, water quality testing worksheet

Number of students reached:

☐ Materials distributed to 7-12 Students?

Description of materials distributed to 7-12 Students:

Number of Distribution:

Annual budget for school education program: $20,000.00

Description of all other water supplier education programs:

School Program Activities

Classroom presentations:

Number of presentations: 46 Number of attendees:

Large group assemblies:

Number of presentations: 0 Number of attendees: 0

Children's water festivals or other events:

Number of presentations: 0 Number of attendees: 0

Cooperative efforts with existing science/water education programs (various workshops, science fair awards or judging) and follow-up:

Number of presentations: 0 Number of attendees: 0

Other methods of disseminating information (i.e. themed age-appropriate classroom loaner kits):

Description

Number distributed

Staffing children's booths at events & festivals:

Number of booths | Number of attendees

Water conservation contests such as poster and photo:

Description

Number distributed

Offer monetary awards/funding or scholarships to students:

Number Offered | Total Funding

Teacher training workshops:

Number of presentations | Number of attendees

Fund and/or staff student field trips to treatment facilities, recycling facilities, water conservation gardens, etc.:

Number of tours or field trips: 26 | Number of participants: 728

College internships in water conservation offered:

Number of internships | Total funding

Career fairs/workshops:

Number of presentations | Number of attendees

Additional program(s) supported by agency but not mentioned above:

Description

Number of events (if applicable) | Number of participants

Total reporting period budget expenditures for school education programs (include all agency costs): 20,000

Comments

The fields in red are required.

Agency name: City of Benicia

Reporting unit name (District name): City of Benicia

Reporting unit number: 6291

Primary contact:

First name: David

Last name: Wenslawski

Email: Davidw@ci.benicia.ca.us

Submit Form

You must enter the [illegible] we have on record for your agency. Click here to open a table to obtain this number.

Link to FAQs

View MOU

2009 BMP 3 Residential

○ Traditional (Sections A - D)

○ Flex Track (All Sections)

For Traditional Track please answer the fields within the traditional boxes.
For Flex Track option, please answer the fileds within the flex track boxes.
You must enter all measured water savings manually. For each measure entered, upload a spreadsheet with sufficient information to show the way that water savings were measured and that the measure was adequately tracked (i.e., all relevant data was collected) - in some cases there are specific data points also requested in form which are necessary to show that the measure was implemented as described.

A) Residential Assistance / Leak Detection

Traditional

	Single Family	Multi Family	Total Water Savings AF/YR	Measured Water Savings AF/YR
Total Number of Accounts	8,598.00	306.00		
Total Number of Participants Overall	458.00			
Total Number of Leak Det Surveys	458.00			
Total Number of Showerheads	15.00			
Total Number of Faucet Aerators	25.00			
Total Number of Landscape Water Survey	138.00		15.80	

Number of Other Components

Description of Other Components Distributed

Flex Track

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data)
(Enter the file name and Email file to Natalie@cuwcc.org)

B) High Efficiency Clothes Washers (HECWs)

Traditional

Number of incentives for HECWs with an AVERAGE Water Factor of 5.0: 387.00

Are Financial incentives provided for HECWs ? ○ Yes ○ No

Has your Agency completed a HECW Market Penetration Study
(this question does not impack your coverage report, purely informational) ○ Yes ○ No

HECW Market Penetration Study Documents (Enter the file name and Email file to Natalie@cuwcc.org)

Measured water savings (AF/Year): 9.30

Flex Track

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

C) WaterSense Specification (WSS) Toilets

(Agency must complete information for at least one coverage option (For Traditional 1, 2, or 3; For Flex Tarck 1, 2, 3, or 4).
You are encouraged to include information on other coverage options, as available.
If seeking credit for additional water savings, you must select Flex Track option)

Traditional

1. Retrofiton Resale Ordinance is in Place ○ Yes ○ No

If Yes, Choose A File (Enter the file name and Email file to Natalie@cuwcc.org)

2. A 75% Market Saturation Achieved ○ Yes ○ No

If yes, Choose A File (Enter the file name and Email file to Natalie@cuwcc.org)

3. WSS Toilets Installed

	Single Family	Multi Family
Number of WSS Toilets Installed	72.00	
Measured Water Savings AF/YR	2.10	

Flex Track

4. Non-WSS Toilets

	Single Family		Multi Family	
Type of Toilets	Number of Toilets	Water Savings	Number of Toilets	Water Savings
Select an Option				

Description of Other Non-WSS Type of Toilets

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

D) WSS for New Residential Development

(Agency must complete information for at least one coverage option.You are encouraged to include information on other coverageoptions, as available. If seeking credit for additional water savings you must select the Flex Track option)

Traditional

	Single Family	Multi Family
Residential development Rebates	Yes ○ No ○	Yes ○ No ○
Recognition Programs	Yes ○ No ○	Yes ○ No ○
Reduced connection Fees	Yes ○ No ○	Yes ○ No ○
Ordinances	Yes ○ No ○	Yes ○ No ○

New Development Ordinance
(Enter the file name and Email file to Natalie@cuwcc.org)

Number of new Single Family Units built in Service Area

Number of new Multi Family Units built in Service Area

Flex Track

In the following table, enter one row for each incentive typr program you offer

List of Incentive Amount

Incentive Type	Incentive Amount	Number of WSS fixtures installed	Number of Participating		Measured Water Savings	
			Single Family	Multi Family	Single Family	Multi Family

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

For Traditional Option, Stop Here, do not go further.
For Flex Track Option, please continue...

Flex Track Menu Options

In addition to the measures on the BMP List, the Flex Track menu options may be implemented to meet the savings goal for this BMP. Fill in the water savings measures that your agency has implemented.

E) High bill contact with single-family and multi-family customers

Measured water savings (AF/Year)

Select the Types of Contact:

☐ Email ☐ Phone ☐ Letter ☐ Others (describe)

Upload sample of contact contents (email, letter, etc.)
– if applicable; enter the file name and email file to Natalie@cuwcc.org

Who initiated the contact: (Please Specify customer, agencies, or both)

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data)

(Enter the file name and Email file to Natalie@cuwcc.org)

F) Educate residential customers about the behavioral aspects of water conservation

Measured water savings (AF/Year)

Select types of educational methods used:	**# Events**	**# Customers Reached**
☐ Workshop		
☐ Community Event		
☐ Letter		
☐ On-Site Visit		
☐ Phone Call		
☐ Water Survey		
☐ Website Hit		
☐ Door Hanger		
☐ Other (Describe)		

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data)
(Enter the file name and Email file to Natalie@cuwcc.org)

G) Notify residential customers of leaks on the customer's side of the meter

Measured water savings (AF/Year)

Type of Notification (Describe)

How many were sent out?

Upload sample notification method(email, letter, etc.) – if applicable

(Enter the file name and Email file to Natalie@cuwcc.org

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data)
(Enter the file name and Email file to Natalie@cuwcc.org)

H) Provide bill or surcharge refunds for customers to repair leaks on the customer's side of the meter.

Measured water savings (AF/Year)

Number of Leaks Repaired

Number of bill adjustments/credits/refunds provided

Describe here or upload a document with a policy description below:

Upload file describing Policy (Enter the file name and Email file to Natalie@cuwcc.org)

If you are using your own water-savings measure, send your supporting spreadsheet

Enter the file name and Email to Natalie@cuwcc.org

I) Provide unique water savings fixtures that are not included in the BMP list above

Fixture or Device	Description	Quantity Installes	Measured water savings (AF/YR)

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data)
(Enter the file name and Email file to Natalie@cuwcc.org)

J) Install residence water use monitors.

Type of Monitor	Brand	Number Installed
☐ Dashboard		
☐ Leak Detector		
☐ Data Logger		

Measured water savings (AF/Year)

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data)
(Enter the file name and Email file to Natalie@cuwcc.org)

K) Participate in programs that provide residences with school water conservation kits.

Number of Kits Distributed

Kit contents (including model of fixtures)

List of what was actually installed in the homes (number of showerheads, aerators etc.).

Measured water savings (AF/Year)

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data)
(Enter the file name and Email file to Natalie@cuwcc.org)

L) Implement an automatic meter reading program for residential customers.

AMR or AMI Select an Option

Type of Network Select an Option

Number of connections installed

☐ Is your agency using these to contact high water-use customers?

Measured water savings (AF/Year)

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data)
(Enter the file name and Email file to Natalie@cuwcc.org)

OTHER Types of Measures.

Type of Program	Sample / Description	Measured Water Savings (AF/YR)

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data)
(Enter the file name and Email file to Natalie@cuwcc.org)

Comments

The fields in red are required.

Agency name: City of Benicia

Reporting unit name (District name): City of Benicia

Reporting unit number: 6291

Primary contact:

First name: David

Last name: Wenslawski

Email: DavidW@ci.benicia.ca.us

Submit Form

we have on record for your agency. Click here to open a table to obtain this number.

2009

Link to FAQs

View MOU

BMP 4 CII

Traditional (Section A - L) ○ Flex Track (All Sections) ○

For Traditional Track please answer the fields within the traditional boxes.
For Flex Track option, please answer the fileds within the flex track boxes.

You must enter all measured water savings manually in the summary cells on the right. For each measure entered, upload a spreadsheet with sufficient information to show the way that water savings was measured and that the measure was adequately tracked (i.e., all relevant data was collected) - in some cases there are specific data points also requested in the flex track data entry form which are necessary to show that the measure was implemented as described.

CII Type of measure implemented

Traditional

A) High - Efficiency Toilets.

Measured water savings (AF/Year)

Number

Type of program: Direct install

Other type of program

Flex Track

Do you accept the Council's default savings number for this measure? ○Yes○No

Council's Annual Water Savings 0.041748 AF per device

If not, Please provide the following:

Total Measured Water Savings(AF/Year)

Measure life (years)

Lifetime water savings (years)

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

B) High - Efficiency Urinals (0.5 gpf)

Traditional

Number

Type of program

Other type of program

Measured water savings (AF/Year)

Flex Track

Do you accept the Council's default savings number for this measure? ○Yes ○No

Council's Annual Water Savings 0.069086 AF per device

If not, Please provide the following

Total Measured Water Savings(AF/Year)

Measure life (years)

Lifetime water savings (years)

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

C) Ultra Low Volume Urinals (0.125 gpf)

Traditional

Number

Type of program Select an Option

Other type of program

Measured water savings (AF/Year)

Flex Track

Do you accept the Council's default savings number for this measure? ○Yes ○No

Council's Annual Water Savings 0.080603 AF per device

If not, Please provide the following

Total Measured Water Savings(AF/Year)

Measure life (years)

Lifetime water savings (years)

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

D) Zero Consumption Urinals (0.0 gpf)

Traditional

Number

Type of program Select an Option

Other type of program

Measured water savings (AF/Year)

Flex Track

Do you accept the Council's default savings number for this measure? ○Yes ○ No

Flex Track

If not, Please provide the following:

Total Measured Water Savings(AF/Year)

Measure life (years)

Lifetime water savings (years)

Council's Annual Water Savings 0.0921146 AF per device

If you are using your own water-savings measure, send your supporting spreadsheet

Enter the file name and Email to Natalie@cuwcc.org

E) Commercial High - Efficiency Single Load Clothes Washers

Traditional

Number

Type of program

Other type of program

Measured water savings (AF/Year)

Flex Track

Do you accept the Counsil's default savings number for this measure ? ○Yes○No

Council's Annual Water Savings 0.116618 AF per device

If not , Please provide the following:

Total Measured Water Savings(AF/Year)

Measure life (years)

Lifetime water savings (years)

If you are using your own water-savings measure, send your supporting spreadsheet

Enter the file name and Email to Natalie@cuwcc.org

F) Cooling Tower Conductivity Controllers.

Traditional

Number

Type of program Select an Option

Other type of program

Measured water savings (AF/Year)

Flex Track

Do you accept the Council's default savings number for this measure ? ○Yes○No

Council's Annual Water Savings 1.032250 AF per device

If not, Please provide the following:

Total Measured Water Savings(AF/Year)

Measure life (years)

Lifetime water savings (years)

If you are using your own water-savings measure, send your supporting spreadsheet

Enter the file name and Email to Natalie@cuwcc.org

G) Cooling Tower pH Controllers

Traditional

Number

Type of program: Select an Option

Other type of program

Measured water savings (AF/Year)

Flex Track

Do you accept the Council's default savings number for this measure ? ○Yes○No

Council's Annual Water Savings 3.981543 AF per device

If not, Please provide the following:

Total Measured Water Savings(AF/Year)

Measure life (years)

Lifetime water savings (years)

If you are using your own water-savings measure, send your supporting spreadsheet

Enter the file name and Email to Natalie@cuwcc.org

H) Connectionless Food Steamers.

Traditional

Number

Type of program

Other type of program

Measured water savings (AF/Year)

Flex Track

Do you accept the Council's default savings number for this measure ? ○Yes○No

Council's Annual Water Savings 0.25 AF per Steamer Compartment

mIf not, Please provide the following:

Total Measured Water Savings(AF/Year)

Measure life (years)

Lifetime water savings (years)

If you are using your own water-savings measure, send your supporting spreadsheet

Enter the file name and Email to Natalie@cuwcc.org

I) Medical Equipment Steam Sterilizers

Flax Track

Traditional

Number

Type of program

Other type of program

Measured water savings (AF/Year)

Flex Track

Do you accept the Council's default savings number for this measure? ○Yes○No

Council's Annual Water Savings 1.538 AF per device

If not, Please provide the following:

Total Measured Water Savings(AF/Year)

Measure life (years)

Lifetime water savings (years)

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

J) Water - Efficient Ice Machines.

Traditional

Number

Type of program: Select an Option

Other type of program

Measured water savings (AF/Year)

Flex Track

Do you accept the Council's default savings number for this measure ? ○Yes○No

Council's Annual Water Savings 0.0834507 AF per device

If not, Please provide the following:

Total Measured Water Savings(AF/Year)

Measure life (years)

Lifetime water savings (years)

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

K) Pressurized Water Brooms.

Traditional

Number

Type of program: Select an Option

Other type of program

Measured water savings (AF/Year)

Flex Track

Do you accept the Council's default savings number for this measure? ○Yes○No

Council's Annual Water Savings 0.1534 AF per device

Flex Track

If not, Please provide the following:

Total Measured Water Savings(AF/Year)

Measure life (years)

Lifetime water savings (years)

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

L) Dry Vacuum Pumps.

Traditional

Number

Type of program Select an Option

Other type of program

Measured water savings (AF/Year)

Flex Track

Do you accept the Council's default savings number for this measure ? ○Yes○No

Council's Annual Water Savings 0.064 AF per device

If not, Please provide the following:

Total Measured Water Savings(AF/Year)

Measure life (years)

Lifetime water savings (years)

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

Traditional Reporting Stop Here, Do not continue

Flex Track Reporing Please Continue...

M) Industrial Process Water Use Reduction.

Number

Type of program Select an Option

Other type of program

Measured water savings (AF/Year)

Type of Process Water Reduced

If re-using water, what was the secondary use of the water? (such as pre-rince cycle or landscaping)

Total Measured Water Savings(AF/Year)

Measure life (years)

Lifetime water savings (years)

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

N) Commercial Laundry Retrofits.

Number of customers

Measured water savings (AF/Year)

Type of customer

- hotels
- campuses
- prisons
- laundromats

Lease / own machines

Lease Own Machines Both

Type of program

Select an Option

Other type of program

Total Measured Water Savings(AF/Year)

Measure life (years)

Lifetime water savings (years)

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

O) Industrial Laundry Retrofits.

Measured water savings (AF/Year)

Total Number of customers

Total Volume of laundry processed annually

Select an Option

Type of program

Select an Option

Other type of program

Total Measured Water Savings(AF/Year)

Measure life (years)

Lifetime water savings (years)

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

P) Filter Upgrades (for pools, spas, and fountains).

Number of pools upgraded

Number of spas upgraded

Number of fountains upgraded

Measured water savings (AF/Year)

Type of program

Select an Option

Other type of program

Total Measured Water Savings(AF/Year)

Measure life (years)

Lifetime water savings (years)

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

Q) Car Wash Reclamation Systems

Measured water savings (AF/Year)

	Conveyor	In-bay
Total Number of program participants (accounts)		
Total Number of vehicles washed annually		

Do you accept the Council's default savings number for this measure? ○Yes○No

Council's Annual Water Savings 0.00004607 (or 15 gals) per vehicle

If not, Please provide the following:

Total Measured Water Savings(AF/Year)	
Measure life (years)	
Lifetime water savings (years)	

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

R) Wet Cleaning.

		Measured water savings (AF/Year)
Brief description of program		

Total Measured Water Savings(AF/Year)	
Measure life (years)	
Lifetime water savings (years)	

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

S) Water Audits (To avoid double counting, do not include device/replacement water savings.)

Number of water audits by type of business

		Measured water savings (AF/Year)
Auto		
Food		
Health		
Hotels		

Manufacturing	
Membership	
Multi-use	
Office	
Religious	
Restaurant	
Retail/ Wholesale	
School	
Other (with description)	
Description of Other	

Total Measured Water Savings(AF/Year)	
Measure life (years)	
Lifetime water savings (years)	

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

T) Clean In Place (CIP) Technology (such as bottle sterilization in a beverage processing plant)

		Measured water savings (AF/Year)
Number of customers		
Type of program	Select an Option	
Other type of program		

Total Measured Water Savings(AF/Year)	
Measure life (years)	

Lifetime water savings (years)

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

U) Waterless Wok

Number

Type of program

Select an Option

Measured water savings (AF/Year)

Total Measured Water Savings(AF/Year)

Measure life (years)

Lifetime water savings (years)

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

V) Alternative On-site Water Sources (For Rain Water Harvesting, commercial rain barrels are excluded. For Foundation Drain Water, exclude permeable paving.)

Measured water savings (AF/Year)

Select type	Number	Description
☐ Cooling Condensate		
☐ Foundation Drain Water		
☐ Gray Water		
☐ Storm Water		
☐ Rain Water		
☐ Pond and Water Feature Recycling		

Total Measured Water Savings(AF/Year)

Measure life (years)

Lifetime water savings (years)

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

W) Sub - metering

Measured water savings (AF/Year)

Select type	Number	Description
☐ Condominiums		
☐ Apartments		
☐ Mobile Homes		

Do you accept the Council's default savings numbers for this measure? ○ Yes ○ No

Council's Annual Water Savings
Appartments & Condos=0.024419 AF/YR
Mobile Home = 0.056774 AF/Yr

If not, Please provide the following:

Total Measured Water Savings(AF/Year)

Measure life (years)

Lifetime water savings (years)

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

X) High Efficiency Showerheads

Measured water savings (AF/Year)

Number

Type of program Select an Option

Other type of program

Total Measured Water Savings(AF/Year)

Measure life (years)

Lifetime water savings (years)

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

Y) Faucet Flow Restrictors

Measured water savings (AF/Year)

Number

Type of program Select an Option

Other type of program

Total Measured Water Savings(AF/Year)

Measure life (years)

Lifetime water savings (years)

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

Z) Water Efficient Dishwashers

Measured water savings (AF/Year)

Select type Number

☐ Rack

☐ Conveyor

☐ Other

Description of Other

Type of program Select an Option

Other type of program

Total Measured Water Savings(AF/Year)

Measure life (years)

Lifetime water savings (years)

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

AA) Hot Water on Demand

Measured water savings (AF/Year)

Number

Type of program

Select an Option

Other type of program

Total Measured Water Savings(AF/Year)

Measure life (years)

Lifetime water savings (years)

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

BB) Pre-rinse Spray Valves of 1.3 gpm (gallons per minute) or less

Measured water savings (AF/Year)

Number

Type of program

Select an Option

Other type of program

Total Measured Water Savings(AF/Year)

Measure life (years)

Lifetime water savings (years)

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

CC) Central Flush Systems

		Measured water savings (AF/Year)
Number		
Type of program	Select an Option	
Other type of program		

Total Measured Water Savings(AF/Year)

Measure life (years)

Lifetime water savings (years)

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

Other Measures chosen by the Agency

		Measured water savings (AF/Year)
Description of program		
Sample (if applicable)		

Total Measured Water Savings(AF/Year)

Measure life (years)

Lifetime water savings (years)

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

The fields in red are required.

Agency name: City of Benicia

Reporting unit name (District name): City of Benicia

Reporting unit number: 6291

Primary contact:

First name: David

Last name: Wenslawski

Email: DavidW@ci.benicia.ca.us

You must enter the reporting unit number that we have on record for your agency. Click here to open a table to obtain this number.

Link to FAQs

View MOU

2009

BMP 5 Landscape

○ **Traditional** ○ **Flex Track**

For Traditional Track please answer the fields within the traditional boxes.
For Flex Track option, please answer the fileds within the flex track boxes.
You must enter all measured water savings manually. For each measure entered, upload a spreadsheet with sufficient information to show the way that water savings were measured and that the measure was adequately tracked (i.e., all relevant data was collected) - in some cases there are specific data point salso requested in form which are necessary to show that the measure was implemented as described.

Accounts with Dedicated Irrigation Meters

Traditional

Number of dedicated irrigation meter accounts	279.00
Number of dedicated irrigation meter accounts with water budgets	0.00
Aggregate water use for dedicated non-recreational landscape accounts with budgets	
Aggregate acreage assigned water budgets for dedicated non-recreational landscape accounts with budgets	0.00
Preserved water use records and budgets for customers with dedicated landscape irrigation accounts for at least four years	○ Yes ○ No

Flex Track

Water Savings from Accounts with dedicated irrigation meters with water budgets (Acre Feet)

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data)

(Enter the file name and Email file to Natalie@cuwcc.org)

Technical Assistance

Traditional

Number of Accounts 20% over-budget	0.00
Number of accounts 20% over-budget offered technical assistance	0.00
Number of accounts 20% over-budget accepting technical assistance	0.00

Measured water savings (AF/Year)

Flex Track

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data)

(Enter the file name and Email file to Natalie@cuwcc.org)

Irrigation Water Use Surveys for Mixed-use and Un-metered Accounts

Traditional

Number of mixed use and un-metered accounts	
Number of irrigation water use surveys offered (cumulative, all years)	
Number of irrigation water use surveys accepted (cumulative)	
Can your Agency estimate the amount of landscape acreage for mixed use and Un-metered accounts	○ Yes ○ No
If Yes, Aggregate acreage for mixed use and Un-metered accounts	

Measured water savings (AF/Year)

Flex Track

Esrimated water demand from acreage for mixed use and Un-metered accounts	
Annual water savings by customers receiving irrigation water savings surveys and implementing recomendations	

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data)
(Enter the file name and Email file to Natalie@cuwcc.org)

Financial Incentives

Traditional

Have you implemented and maintained an irrigation equipment retrofit incentive program? ○ Yes ○ No

Number of incentives	Dollar value of incentives	Incentive Types	Measured Water Savings (AF/YR)
		reimbursement up to 50%	

Flex Track

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data)
(Enter the file name and Email file to Natalie@cuwcc.org)

Traditional Reporting Stop Here, Do not continue
Flex Track Reporing Please Continue...

Landscape Flex Track Measure Types

1. Monitor and report on landscape water use

A) Measure landscapes and develop water budgets for customers with dedicated landscape meters. Provide timely water use reports with comparisons of water use to budget that provide customers the information they need to adjust irrigation schedules (such as faxes, twitter, etc. not included in the previous sections).

Measured water savings (AF/Year)

Enter the Number of sites with:

Dedicated Mixed Meters

Water Budgets

Landscape Measurements

Others (describe)

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data) (Enter the file name and Email file to Natalie@cuwcc.org)

B) Measure landscapes and develop water budgets for customers with Mixed Use meters. Provide timely water use reports with comparisons of water use to budget that provide customers the information they need to adjust irrigation schedules.

Measured water savings (AF/Year)

Enter the Number of sites with:

Dedicated Mixed Meters

Water Budgets

Landscape Measurements

Others (describe)

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data) (Enter the file name and Email file to Natalie@cuwcc.org)

C) Establish agency-wide water budget. (Note that: ETo based water budget in the MWELO changed in 2010 from .8ETo to .7ETo.)

Measured water savings (AF/Year)

Agency-wide total irrigated area (Acres)

Amount of Water Used (AF/Acre)

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data) (Enter the file name and Email file to Natalie@cuwcc.org)

D) Establish agency-wide, sector-based irrigation goal to reduce water use, based on seasonality.

Number of minimum irrigation goal (AF/Acre)

Amount of Water Used per Period (AF/Period)

Measured water savings (AF/Year)

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data) (Enter the file name and Email file to Natalie@cuwcc.org)

2. Provide technical landscape resources and training

A) Upon customer requests, provide landscape irrigation management and landscape design information and resources: provide assistance, answer customer questions, respond to run-off and high-bill calls.

Measured water savings (AF/Year)

Enter the Number of:

Contacts In Person

Contacts over the phone

Contacts via Email

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data) (Enter the file name and Email file to Natalie@cuwcc.org)

B) Perform landscape & irrigation audits: including irrigation scheduling, plant information, and landscape area measurement.

Measured water savings (AF/Year)

Enter the Number of:

Audits conducted per year

Measurement of square footage of Turf areas

Measurement of square footage of NON Turf areas

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data)
(Enter the file name and Email file to Natalie@cuwcc.org)

C) Sponsor, co-sponsor, promote, or support landscape workshops, training, presentations and other technical educational events for homeowners and professionals: design, installation, maintenance, water management.

Enter the Number of:

Events

Participants

List Type or Title of Events

Measured water savings (AF/Year)

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data) (Enter the file name and Email file to Natalie@cuwcc.org)

D) Establish Time-of-Day Irrigation Restrictions.

Yes No

Describe Restrictions:

Measured water savings (AF/Year)

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data) (Enter the file name and Email file to Natalie@cuwcc.org)

E) Establish Day-of-Week Irrigation Restrictions. **Yes** **No**

Describe Restrictions:

Measured water savings (AF/Year)

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data)
(Enter the file name and Email file to Natalie@cuwcc.org)

---

3. Provide incentives

A) Establish Landscape budget-based rates. ◯ Yes ◯ No

Describe Rates:

Measured water savings (AF/Year)

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data) (Enter the file name and Email file to Natalie@cuwcc.org)

B) Provide incentives for conversions from mixed-use meters to dedicated landscape meters.

Number of Conversions:

Measured water savings (AF/Year)

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data) (Enter the file name and Email file to Natalie@cuwcc.org)

C) Provide incentives for installing sub-meters to separate landscape water use

Number of meters installed:

Measured water savings (AF/Year)

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data) (Enter the file name and Email file to Natalie@cuwcc.org)

D) Provide incentives for irrigation equipment upgrades that improve distribution uniformity, irrigation efficiency, or scheduling capabilities.

Select types of irrigation equipment upgrades:	Number of devices installed
☐ Controllers	
☐ Emitters	
☐ Soil moisture sensors	
☐ Pressure Regulators	
☐ Rain shut off devices	
☐ Other (describe)	

Measured water savings (AF/Year)

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data) (Enter the file name and Email file to Natalie@cuwcc.org)

E) Provide incentives for the reduction of water use over an irrigated area, or reduction in the size of the irrigated area due to replacement of turf or other high water-using plants with low water-using plants, artificial turf, or permeable surfaces.

Acreage of live turf converted to low water-using plants, artificial turf, or permeable surfaces: Acres

Measured water savings (AF/Year)

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data) (Enter the file name and Email file to Natalie@cuwcc.org)

F) Provide incentives for conversions from potable to recycled water.

Number of Conversions:

Number of Incentives:

Funds Invested:

Measured water savings (AF/Year)

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data) (Enter the file name and Email file to Natalie@cuwcc.org)

G) Provide incentives for the use of alternative sources of water in the landscape (i.e. gray water, rainwater, cisterns, etc.)

Number of Conversions:

Number of Incentives:

Funds Invested:

Measured water savings (AF/Year)

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data) (Enter the file name and Email file to Natalie@cuwcc.org)

---

4. Participate in local and regional planning and regulatory activities

A) Collaborate with planning agencies at the local and regional level, other water suppliers in the area and stakeholders in response to state or federal requirements such as the State Model Water Efficient Landscape Ordinance and AB 1881. Participate in the development, review, implementation, and enforcement of requirements for new developments. Provide water use data to planning agencies.

Measured water savings (AF/Year)

Public Information Programs List

Agency Type	Describe Involvement	If Ohter: Enter Name	Actions

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data) (Enter the file name and Email file to Natalie@cuwcc.org)

B) Establish or participate in a water conservation advisory committee or other community outreach effort to drive market transformation and exchange information about landscape water conservation with developers, community-based organizations, homeowners associations, residential customers, landscape professionals, educators, other water suppliers in region.

Yes **No**

Describe Involvement:

Measured water savings (AF/Year)

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data) (Enter the file name and Email file to Natalie@cuwcc.org)

C) Participate in regional efforts: integrated water resource management, watershed management, NPDES permit agencies, etc.

Yes **No**

Measured water savings (AF/Year)

Describe Involvement:

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data) (Enter the file name and Email file to Natalie@cuwcc.org)

---

5. Develop a holistic approach to landscape water use efficiency

A) Develop and implement a comprehensive landscape water conservation program for all customers. Target marketing efforts to those most likely to result in benefits to both customer and Agency.

Describe Program:

Measured water savings (AF/Year)

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data) (Enter the file name and Email file to Natalie@cuwcc.org)

---

6. Other Measures

A) Other Landscape Measures.

Measured water savings (Af/Year)

Describe Other Landscape Measures:

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data) (Enter the file name and Email file Natalie@cuwcc.org)

The fields in red are required.

Agency name: City of Benicia

Division name (Reporting unit): City of Benicia

Reporting unit number: 6291

Primary contact:

First name: David

Last name: Wenslawski

Email: DavidW@ci.benicia.ca.us

WATER SOURCES

2009

Service Area Population:

Potable Water

Own Supply Source Name	AF/YEAR	Water Supply Type	Water Supply Description
		Other	
		Other	
		Other	
		Other	
		Other	
		Other	
		Other	
		Other	
		Other	
		Other	
		Other	

Imported Supply Source Name	AF/YEAR	Water Supply Type	Water Supply Description
		Other	
		Other	
		Other	
		Other	
		Other	
		Other	
		Other	
		Other	
		Other	
		Other	
		Other	

Exported Water Name	AF/YEAR	Where Exported?

The fields in red are required.

Agency name: City of Benicia

Division name (Reporting unit): City of Benicia

Reporting unit number: 6291

Primary contact:

First name: David

Last name: Wenslawski

Email: DavidW@ci.benicia.ca.us

Submit Form

Water Uses 2009

Potable Water Billed

Make sure to enter numbers in AF/Year.

Customer Type	Meter Accounts	Metered Water Delivered	Un-metered Accounts	Un-metered Water Delivered	Description
	8,598.00	2,898.00	0.00	0.00	
	306.00	473.00	0.00	0.00	
Commercial	543.00	418.00	0.00	0.00	
Industrial	79.00	101.00	0.00	0.00	
Dedicated Irrigation	279.00	602.00	0.00	0.00	
Other	8.00	27.00	0.00	0.00	
Other					
Other					
Other					
Other					
Other					
Other					
Other					

Potable Water Un-Billed

Customer Type	Meter Accounts	Metered Water Delivered	Un-metered Accounts	Un-metered Water Delivered	Description
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					

The fields in red are required.

Agency name: City of Benicia

Division name (Reporting unit): City of Benicia

Reporting unit number: 6291

Primary contact:

First name: David

Last name: Wenslawski

Email: DavidW@ci.benicia.ca.us

Submit Form

2009

Service Area Population:

Non- Potable Water

If you select Other for type, enter

Own Supply Source Name	AF/YEAR	Water Supply Type	Water Supply Description
		Select a water type.	
		Select a water type.	
		Select a water type.	
		Select a water type.	
		Select a water type.	
		Select a water type.	
		Select a water type.	
		Select a water type.	
		Select a water type.	
		Select a water type.	
		Select a water type.	

Imported Supply Source Name	AF/YEAR	Water Supply Type	Water Supply Description
North Bay Aqueduct - SWP	4,636.00	Surface	
Putah South Canal	2,225.00	Surface	
Settlement Water	2,515.00	Surface	
Mojave	1,500.00	Surface	
		Select a water type.	
		Select a water type.	
		Select a water type.	
		Select a water type.	
		Select a water type.	
		Select a water type.	
		Select a water type.	

Exported Water Name	AF/YEAR	Where Exported? such as groundwater recharge, retail,
Lake Herman	239.40	Surface water storage in lake herman

The fields in red are required.

Agency name: City of Benicia

Division name (Reporting unit): City of Benicia

Reporting unit number: 6291

Primary contact:

First name: David

Last name: Wenslawski

Email: DavidW@ci.benicia.ca.us

Submit Form

Water Uses

2009

Non-Potable Billed

Customer Type	Meter Accounts	Metered Water Delivered	Un-metered Accounts	Un-metered Water Delivered	Description
Industrial	1.00	4,735.00			
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					

Non-Potable Un-Billed

Customer Type	Meter Accounts	Metered Water Delivered	Un-metered Accounts	Un-metered Water Delivered	Description
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					

I-3 City of Benicia 2010 BMP Reports

The fields in red are required.

Agency name: City of Benicia

Reporting unit name (District name): City of Benicia

Reporting unit number: 6291

Primary contact:

First name: David

Last name: Wenslawski

Email: DavidW@ci.benicia.ca.us

You must enter the reporting unit numbe we have on record fo agency. Click here to open a table to obtain this number.

Submit Form

Link to FAQs

2010

BMP 1.1 Operations Practices

Comments:

See the complete MOU: View MOU

See the coverage requirements for this BMP:

Conservation Coordinator

Conservation Coordinator ◯ Yes ◯ No

Contact Information

First Name	David
Last Name	Wenslawski
Title	Water Quality technician
Phone	707-746-4792
Email	davidw@ci.benicia.ca.us

Note that the contact information may be the same as the primary contact information at the top of the page. If this is your case, excuse the inconvenience but please enter the information again.

Water Waste Prevention

Water Agency shall do one or more of the following:

a. Enact and enforce an ordinance or establish terms of service that prohibit water waste
b. Enact and enforce an ordinance or establish terms of service for water efficient design in new development
c. Support legislation or regulations that prohibit water waste
d. Enact an ordinance or establish terms of service to facilitate implementation of water shortage response measures
e. Support local ordinances that prohibit water waste
f. Support local ordinances that establish permits requirements for water efficient design in new

To document this BMP, provide the following:

a. A description of, or electronic link to, any ordinances or terms of service
b. A description of, or electronic link to, any ordinances or requirements adopted by local jurisdictions or regulatory agencies with the water agency's service area.
c. A description of any water agency efforts to cooperate with other entities in the adoption or enforcement of local requirement
d. description of agency support positions with respect to adoption of legislation or regulations

You can show your documentation by providing files, links (web addresses), and/or entering a description.

File name(s): Email files to natalie@cuwcc.org

Web address(s) URL: comma-separated list

Enter a description:

I'm not able to add a web link so I'll give direction on how to fine the ordinance online. Go to www.ci.benicia.ca.us and click on the tab for municipal code on the left. Go to title 13 chapter 13.35 to see the emergency water conservation plan.

The fields in red are required.

Agency name: City of Benicia

Reporting unit name (District name): City of Benicia

Reporting unit number: 6291

Primary contact:

First name: David

Last name: Wenslawski

Email: DavidW@ci.benicia.ca.us

You must enter the reporting unit number that we have on record for your agency. Click here to open a table to obtain this number.

Link to FAQs

2010 BMP 1.2 Water Loss Control

View MOU

AWWA Water Audit

Agency to complete a Water Audit & Balance Using The AWWA Software ⦿ Yes ○ No

Email to natalie@cuwcc.org - Worksheets (AWWA Water Audit). Enter the name of the file below:

Water Audit Validity Score from AWWA spreadsheet: 56

Agency Completed Training In The AWWA Water Audit Method ⦿ Yes ○ No

Agency Completed Training In The Component Analysis Process ⦿ Yes ○ No

Completed/Updated the Component Analysis (at least every 4 years)? ○ Yes ⦿ No

Component Analysis Completed/Updated Date

Water Loss Performance

Agency Repaired All Reported Leaks & Breaks To The Extent Cost Effective ⦿ Yes ○ No

Recording Keeping Requirements:

Date/Time Leak Reported	Leak Location
Type of Leaking Pipe Segment or Fitting	Leak Running Time From Report to Repair
Leak Volume Estimate	Cost of Repair

Agency Located and Repaired Unreported Leaks to the Extent Cost Effective ⦿ Yes ○ No

Type of Program Activities Used to Detect Unreported Leaks

City maintance staff use leak detection equipement to iocate unreported leaks.

Annual Summary Information

Complete the following table with annual summary information (required for reporting years 2-5 only)

Total Leaks Repaired	Economic Value Of Real Loss	Economic Value Of Apparent Loss	Miles Of System Surveyed For Leaks	Pressure Reduction Undertaken for loss reduction	Cost Of Interventions	Water Saved (AF/Year)
107	$39,705.00	$240,696.00		✔		

Comments:

version 1.0

2009

The fields in red are required.

Agency name: City of Benicia

Reporting unit name (District name): City of Benicia

Reporting unit number: 6291

Primary contact:

First name: David

Last name: Wenslawski

Email: DavidW@ci.benicia.ca.us

You must enter the reporting unit number

Submit Form

agency. Click here to open a table to obtain this number.

BMP 1.3 Metering with Commodity

2010

Link to FAQs

See the complete MOU: View MOU

See the coverage requirements for this BMP:

Implementation

Does your agency have any unmetered service connections? Yes No

If YES, has your agency completed a meter retrofit plan? Yes No

Enter the number of previously unmetered accounts fitted with meters during reporting year: 0

Are all new service connections being metered? Yes No

Are all new service connections being billed volumetrically? Yes No

Has your agency completed and submitted electronically to the Council a written plan, policy or program to test, repair and replace meters? Yes No

Please Fill Out The Following Matrix

Account Type	# Metered Accounts	# Metered Accounts Read	# Metered Accounts Billed by Volume	Billing Frequency Per Year	# of estimated bills/yr
Single-Family	8,598	8,598	8,598	Bi-monthly	6
Multi-Family	306	306	306	Bi-monthly	6
Commericial	543	543	543	Bi-monthly	6
Industrial	79	79	79	Bi-monthly	6
Dedicated Irrigatic	279	279	279	Bi-monthly	6
Other	8	8	8	Bi-monthly	6
Other				Other	
Other				Other	
Other				Other	
Other				Other	

Number of CII Accounts with Mixed-use Meters

Number of CII Accounts with Mixed-use Meters Retrofitted with Dedicated Irrigation Meters during Reporting Period

Feasibility Study

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? Yes No

If YES, please fill in the following information:

A. When was the Feasiblity Study conducted

B. Describe, upload or provide an electronic link to the Feasibility Study Upload File

File name(s): Email files to natalie@cuwcc.org Enter the file name here e.g. WaterWastePreventionOrdinance

Web address(s) URL: comma-separated list Enter the URL to your documentation.

Comments:

The fields in red are required.

Agency name: City of Benicia

Reporting unit name (District name): City of Benicia

Reporting unit number: 6291

Primary contact:

First name: David

Last name: Wenslawski

Email: DavidW@ci.benicia.ca.us

You must enter the reporting unit number that we have on record for your agency. Click Submit Form to obtain this number.

Submit Form

CUWCC

2010

Link to FAQs

View MOU

BMP 1.4 Retail Conservation Pricing

If you are reporting more rate structures than this form allows, add the structures to a spreadsheet and send the file to natalie@cuwcc.org.

Implementation (Water Rate Structure)

Enter the Water Rate Structures that are assigned to the majority of your customers, by customer class

Rate Structure	Customer Class	Total Revenue Commodity Charges	Total Revenue Customer Meter/Service (Fixed Charges)
Increasing Block	Single-Family	1,786,541.00	1,423,828.00
Increasing Block	Multi-Family	350,844.00	273,131.00
Increasing Block	Commercial	740,972.00	405,683.00
Increasing Block	Industrial	100,538.00	46,899.00
Increasing Block	Institutional	341,706.00	30,229.00
Increasing Block	Other		28,238.00
Select a Rate Struc	Select a Customer Ty		

Implementation Option (Conservation Pricing Option)

- ○ Use Annual Revenue As Reported
- ○ Use Canadian Water & Wastewater Association Rate Design Model

If CWWA is select, enter the file name and email the spreadsheet to natalie@cuwcc.org

Retail Waste Water (Sewer) Rate Structure by Customer Class

Agency Provide Sewer Service ○ Yes ○ No

Select the Retail Waste Water(Sewer) Rate Structure assigned to the majority of your customers within a specific customer class.

Rate Structure	Customer Class	Total Revenue Commodity Charges	Total Revenue Customer Meter/Service (Fixed Charges)
Uniform	Single-Family		4,092,660.59
Uniform	Multi-Family		1,240,649.88
Increasing Block	Commercial	1,025,927.97	
Uniform	Other		136,656.75
Uniform	Other		12,821.93
Increasing Block	Institutional	26,174.51	
Select a Rate Struc	Select a Customer Ty		

Comments:

The fields in red are required.

Agency name: City of Benicia

Reporting unit name (District name): City of Benicia

Reporting unit number: 6291

Primary contact:

First name: David

Last name: Wenslawski

Email: DavidW@ci.benicia.ca.us

Click here to open a table that displays your agency name, reporting unit name and reporting unit number. Please ensure that you enter the correct information.

Submit Form

Link to FAQs

2010

BMP 2.1 Public Outreach - Retail Reporting

View MOU

Is a Wholesale Agency Performing Public Outreach?

Are there one or more wholesale agencies performing public outreach which can be counted to help your agency comply with the BMP? ○ Yes ○ No

Enter the name(s) of the wholesale agency (comma delimited): Solano County Water Agency

Is your agency performing public outreach?

Report a minimum of 4 water conservation related contacts your agency had with the public during the year.

Public Information Programs List

Did at least one contact take place during each quarter of the reporting year? ☐

Number of Public Contacts	Public Information Programs
1	Newsletter articles on conservation
1	Website
2	General water conservation information
	Select a public contact
	Select a public contact

Contact with the Media

Are there one or more wholesale agencies performing media outreach which can be counted to help your agency comply with the BMP? ○ Yes ○ No

Enter the name(s) of the wholesale agency (comma delimited): solano county water agency

OR Retail Agency (Contacts with the Media)

Did at least one contact take place during each quarter of the reporting year? ☐

Media Contacts List

Number of Media Contacts	Did at least one contact take place during each quarter of the reporting year?	Media Contact Types
		Select a type of media contact
		Select a type of media contact
		Select a type of media contact
		Select a type of media contact
		Select a type of media contact
		Select a type of media contact

Is a Wholesale Agency Performing Website Updates?

Did one or more CUWCC wholesale agencies agree to assume your agency's responsibility for meeting the requirements of and for CUWCC reporting of this BMP? ○ Yes ○ No

Enter the name(s) of the wholesale agency (comma delimited)

solano county water agency

Is Your Agency Performing Website Updates?

Enter your agency's URL (website address): www.solanosaveswater.org

Describe a minimum of four water conservation related updates to your agency's website that took place during the year:

solano county water agency maintanes the website.

Did at least one Website Update take place during each quarter of the reporting year? ○ Yes ○ No

Public Outreach Annual Budget

Enter budget for public outreach programs. You may enter total budget in a single line or brake the budget into discrete categories by entering many rows. Please indicate if personnel costs are included in the entry.

Category	Amount		Personnel Costs Included? If yes, check the box.	Comments	
outreach	$6,000				

Comments:

The fields in red are required.

Agency name: City of Benicia

Reporting unit name (District name): City of Benicia

Reporting unit number: 6291

Primary contact:

First name: David

Last name: Wenslawski

Email: DavidW@ci.benicia.ca.us

Click here to open a table that displays your agenc reporting unit name reporting unit number. Please ensure that you enter the correct information.

Submit Form

Link to FAQs

2010

BMP 2.1 Public Outreach Cont'd

View MOU

Public Outreach Expenses

Enter expenses for public outreach programs. Please include the same kind of expenses you included in the question related to your budget (Section 2.1.7, above). For example, if you included personnel costs in the budget entered above, be sure to include them here as well.

Expense Category	Expense Amount	Personnel Costs Included?	
outreach	$5,000	☐	If yes, check the check box.
		☐	
		☐	
		☐	

Additional Public Information Program

Please report additional public information contacts. List these additional contacts in order of how your agency views their importance / effectiveness with respect to conserving water, with the most important/ effective listed first (where 1 = most important).

Were there additional Public Outreach efforts? ○ Yes ○ No

Public Outreach Additional Information

Public Information Programs	Importance	
	$1	
	$2	
	$3	

Social Marketing Programs

Branding

Does your agency have a water conservation "brand," "theme" or mascot? ○ Yes ○ No

Describe the brand, theme or mascot. Be Green Save Blue

Market Research

Have you sponsored or participated in market research to refine your message? ○ Yes ○ No

Market Research Topic

Brand Message

Brand Mission Statement

Community Committees

Do you have a community conservation committee? ○ Yes ○ No

Enter the names of the community committees: Solano County Urban Water Conservation Committee

Training

Training Type	# of Trainings	# of Attendees	Description of Other
Water Wise Landscapi	$3	$120	

Social Marketing Expenditures

Public Outreach Social Marketing Expenses

Expense Category	Expense Amount	Description
public education	5000	

Partnering Programs - Partners

Name	Type of Program
☐ CLCA?	
☐ Green Building Programs?	
☐ Master Gardeners?	water wise landscaping
☐ Cooperative Extension?	
☐ Local Colleges?	
☐ Other	

☐ Retail and wholesale outlet; name(s) and type(s) of programs:

Partnering Programs - Newsletters

Number of newsletters per year: 1

Number of customers per year	9813

Partnering with Other Utilities

Describe other utilities your agency partners with, including electrical utilities	Partner with Solano County Water Agency, City of Vallejo, City of Fairfield, City of Vacaville, Solano Irrigation District

Conservation Gardens

Describe water conservation gardens at your agency or other high traffic areas or new	Help sponser a water conservation garden at Six Flags Discovery Kindom with Solano County Water Agency and other water providers in Solano county.

Landscape contests or awards

Describe water wise landscape contest or awards program conducted by your agency	Conducted a water wise garden contest. Winner received $250 gift certificate.

Comments:

The fields in red are required.

Agency name: City of Benicia

Reporting unit name (District name): City of Benicia

Reporting unit number: 6291

Primary contact:

First name: David

Last name: Wenslawski

Email: DavidW@ci.benicia.ca.us

Click here to open a table that displays your agency n reporting unit name an reporting unit number. Please ensure that you enter the correct information.

Submit Form

Link to FAQs

2010

BMP 2.2 School Education Programs, Retail Agencies

View MOU

School Programs

Is a wholesale agency implementing school programs which can be counted to help your agency comply with this BMP? ○ Yes ○ No

Enter Wholesaler Names, separated by commas:

☐ Materials meet state education framework requirements?

Description of Materials: Topo map of delta, replica of San Francisco bay, wetland plants, posters and game cards of microorganisms, water quality testing supplies, microscopes, water cycle poster, rainfall graphs, water use timeline, DWR California water use handout, albatross boluses, and calculators.

☐ Materials distributed to K-6 Students?

Description of materials distributed to K-6 Students: Botany safari Worksheet, Pollution Prevention workbook, Captain Hydro workbook, Bolus investigation data/lab sheet, garbage patch tracking sheet, water quality testing worksheet

Number of students reached:

☐ Materials distributed to 7-12 Students?

Description of materials distributed to 7-12 Students:

Number of Distribution:

Annual budget for school education program: $20,000.00

Description of all other water supplier education programs:

School Program Activities

Classroom presentations:

Number of presentations: 46 Number of attendees:

Large group assemblies:

Number of presentations: 0 Number of attendees: 0

Children's water festivals or other events:

Number of presentations: 0 Number of attendees: 0

Cooperative efforts with existing science/water education programs (various workshops, science fair awards or judging) and follow-up:

Number of presentations: 0 Number of attendees: 0

Other methods of disseminating information (i.e. themed age-appropriate classroom loaner kits):

Description

Number distributed

Staffing children's booths at events & festivals:

Number of booths | Number of attendees

Water conservation contests such as poster and photo:

Description

Number distributed

Offer monetary awards/funding or scholarships to students:

Number Offered | Total Funding

Teacher training workshops:

Number of presentations | Number of attendees

Fund and/or staff student field trips to treatment facilities, recycling facilities, water conservation gardens, etc.:

Number of tours or field trips: 26 | Number of participants: 728

College internships in water conservation offered:

Number of internships | Total funding

Career fairs/workshops:

Number of presentations | Number of attendees

Additional program(s) supported by agency but not mentioned above:

Description

Number of events (if applicable) | Number of participants

Total reporting period budget expenditures for school education programs (include all agency costs): 20,000

Comments

The fields in red are required.

Agency name: City of Benicia

Reporting unit name (District name): City of Benicia

Reporting unit number: 6291

Primary contact:

First name: David

Last name: Wenslawski

Email: Davidw@ci.benicia.ca.us

Submit Form

You must enter the [illegible] we have on record for your agency. Click here to open a table to obtain this number.

Link to FAQs

View MOU

2010 BMP 3 Residential

○ Traditional (Sections A - D)

○ Flex Track (All Sections)

For Traditional Track please answer the fields within the traditional boxes.
For Flex Track option, please answer the fileds within the flex track boxes.
You must enter all measured water savings manually. For each measure entered, upload a spreadsheet with sufficient information to show the way that water savings were measured and that the measure was adequately tracked (i.e., all relevant data was collected) - in some cases there are specific data points also requested in form which are necessary to show that the measure was implemented as described.

A) Residential Assistance / Leak Detection

Flex Track

Traditional

	Single Family	Multi Family	Total Water Savings AF/YR	Measured Water Savings AF/YR
Total Number of Accounts	8,598.00	306.00		
Total Number of Participants Overall	458.00			
Total Number of Leak Det Surveys	458.00			
Total Number of Showerheads	15.00			
Total Number of Faucet Aerators	25.00			
Total Number of Landscape Water Survey	138.00		15.80	

Number of Other Components

Description of Other Components Distributed

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data)
(Enter the file name and Email file to Natalie@cuwcc.org)

B) High Efficiency Clothes Washers (HECWs)

Flex Track

Traditional

Number of incentives for HECWs with an AVERAGE Water Factor of 5.0: 387.00

Are Financial incentives provided for HECWs ? ○ Yes ○ No

Has your Agency completed a HECW Market Penetration Study
(this question does not impack your coverage report, purely informational) ○ Yes ○ No

HECW Market Penetration Study Documents (Enter the file name and Email file to Natalie@cuwcc.org)

Measured water savings (AF/Year): 9.30

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

C) WaterSense Specification (WSS) Toilets

(Agency must complete information for at least one coverage option (For Traditional 1, 2, or 3; For Flex Tarck 1, 2, 3, or 4).
You are encouraged to include information on other coverage options, as available.
If seeking credit for additional water savings, you must select Flex Track option)

Traditional

1. Retrofiton Resale Ordinance is in Place ○ Yes ○ No

If Yes, Choose A File (Enter the file name and Email file to Natalie@cuwcc.org)

2. A 75% Market Saturation Achieved ○ Yes ○ No

If yes, Choose A File (Enter the file name and Email file to Natalie@cuwcc.org)

3. WSS Toilets Installed

	Single Family	Multi Family
Number of WSS Toilets Installed	72.00	
Measured Water Savings AF/YR	2.10	

Flex Track

4. Non-WSS Toilets

	Single Family		Multi Family	
Type of Toilets	Number of Toilets	Water Savings	Number of Toilets	Water Savings
Select an Option				

Description of Other Non-WSS Type of Toilets

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

D) WSS for New Residential Development

(Agency must complete information for at least one coverage option.You are encouraged to include information on other coverageoptions, as available. If seeking credit for additional water savings you must select the Flex Track option)

Traditional

	Single Family	Multi Family
Residential development Rebates	Yes ○ No ○	Yes ○ No ○
Recognition Programs	Yes ○ No ○	Yes ○ No ○
Reduced connection Fees	Yes ○ No ○	Yes ○ No ○
Ordinances	Yes ○ No ○	Yes ○ No ○

New Development Ordinance
(Enter the file name and Email file to Natalie@cuwcc.org)

Number of new Single Family Units built in Service Area

Number of new Multi Family Units built in Service Area

Flex Track

In the following table, enter one row for each incentive typr program you offer

List of Incentive Amount

Incentive Type	Incentive Amount	Number of WSS fixtures installed	Number of Participating		Measured Water Savings	
			Single Family	Multi Family	Single Family	Multi Family

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

For Traditional Option, Stop Here, do not go further.
For Flex Track Option, please continue...

Flex Track Menu Options

In addition to the measures on the BMP List, the Flex Track menu options may be implemented to meet the savings goal for this BMP. Fill in the water savings measures that your agency has implemented.

E) High bill contact with single-family and multi-family customers

Measured water savings (AF/Year)

Select the Types of Contact:

☐ Email ☐ Phone ☐ Letter ☐ Others (describe)

Upload sample of contact contents (email, letter, etc.)
– if applicable; enter the file name and email file to Natalie@cuwcc.org

Who initiated the contact: (Please Specify customer, agencies, or both)

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data)

(Enter the file name and Email file to Natalie@cuwcc.org)

F) Educate residential customers about the behavioral aspects of water conservation

Measured water savings (AF/Year)

Select types of educational methods used:	**# Events**	**# Customers Reached**
☐ Workshop		
☐ Community Event		
☐ Letter		
☐ On-Site Visit		
☐ Phone Call		
☐ Water Survey		
☐ Website Hit		
☐ Door Hanger		
☐ Other (Describe)		

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data)
(Enter the file name and Email file to Natalie@cuwcc.org)

G) Notify residential customers of leaks on the customer's side of the meter

Measured water savings (AF/Year)

Type of Notification (Describe)

How many were sent out?

Upload sample notification method(email, letter, etc.) – if applicable

(Enter the file name and Email file to Natalie@cuwcc.org

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data)
(Enter the file name and Email file to Natalie@cuwcc.org)

H) Provide bill or surcharge refunds for customers to repair leaks on the customer's side of the meter.

Measured water savings (AF/Year)

Number of Leaks Repaired

Number of bill adjustments/credits/refunds provided

Describe here or upload a document with a policy description below:

Upload file describing Policy (Enter the file name and Email file to Natalie@cuwcc.org)

If you are using your own water-savings measure, send your supporting spreadsheet

Enter the file name and Email to Natalie@cuwcc.org

I) Provide unique water savings fixtures that are not included in the BMP list above

Fixture or Device	Description	Quantity Installes	Measured water savings (AF/YR)

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data)
(Enter the file name and Email file to Natalie@cuwcc.org)

J) Install residence water use monitors.

Type of Monitor	Brand	Number Installed
☐ Dashboard		
☐ Leak Detector		
☐ Data Logger		

Measured water savings (AF/Year)

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data)
(Enter the file name and Email file to Natalie@cuwcc.org)

K) Participate in programs that provide residences with school water conservation kits.

Number of Kits Distributed

Kit contents (including model of fixtures)

List of what was actually installed in the homes (number of showerheads, aerators etc.).

Measured water savings (AF/Year)

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data)
(Enter the file name and Email file to Natalie@cuwcc.org)

L) Implement an automatic meter reading program for residential customers.

AMR or AMI Select an Option

Type of Network Select an Option

Number of connections installed

☐ Is your agency using these to contact high water-use customers?

Measured water savings (AF/Year)

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data)
(Enter the file name and Email file to Natalie@cuwcc.org)

OTHER Types of Measures.

Type of Program	Sample / Description	Measured Water Savings (AF/YR)

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data)
(Enter the file name and Email file to Natalie@cuwcc.org)

Comments

The fields in red are required.

Agency name: City of Benicia

Reporting unit name (District name): City of Benicia

Reporting unit number: 6291

Primary contact:

First name: David

Last name: Wenslawski

Email: DavidW@ci.benicia.ca.us

Submit Form

we have on record for your agency. Click here to open a table to obtain this number.

2010

Link to FAQs

View MOU

BMP 4 CII

Traditional (Section A - L) ○ Flex Track (All Sections) ○

For Traditional Track please answer the fields within the traditional boxes.
For Flex Track option, please answer the fileds within the flex track boxes.

You must enter all measured water savings manually in the summary cells on the right. For each measure entered, upload a spreadsheet with sufficient information to show the way that water savings was measured and that the measure was adequately tracked (i.e., all relevant data was collected) - in some cases there are specific data points also requested in the flex track data entry form which are necessary to show that the measure was implemented as described.

CII Type of measure implemented

Traditional

A) High - Efficiency Toilets.

Measured water savings (AF/Year)

Number

Type of program: 2

Other type of program

Flex Track

Do you accept the Council's default savings number for this measure? ○Yes○No

Council's Annual Water Savings 0.041748 AF per device

If not, Please provide the following:

Total Measured Water Savings(AF/Year)

Measure life (years)

Lifetime water savings (years)

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

B) High - Efficiency Urinals (0.5 gpf)

Flex Track

Traditional

Number

Type of program

Other type of program

Measured water savings (AF/Year)

Do you accept the Council's default savings number for this measure? ◯Yes◯No

Council's Annual Water Savings 0.069086 AF per device

If not, Please provide the following

Total Measured Water Savings(AF/Year)

Measure life (years)

Lifetime water savings (years)

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

C) Ultra Low Volume Urinals (0.125 gpf)

Flex Track

Traditional

Number

Type of program Secect an Option

Other type of program

Measured water savings (AF/Year)

Do you accept the Council's default savings number for this measure? ◯Yes◯No

Council's Annual Water Savings 0.080603 AF per device

If not, Please provide the following

Total Measured Water Savings(AF/Year)

Measure life (years)

Lifetime water savings (years)

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

D) Zero Consumption Urinals (0.0 gpf)

Flex Track

Traditional

Number

Type of program Select an Option

Other type of program

Measured water savings (AF/Year)

Do you accept the Council's default savings number for this measure? ◯Yes ◯ No

Flex Track

If not, Please provide the following:

Total Measured Water Savings(AF/Year)

Measure life (years)

Lifetime water savings (years)

Council's Annual Water Savings 0.0921146 AF per device

If you are using your own water-savings measure, send your supporting spreadsheet

Enter the file name and Email to Natalie@cuwcc.org

E) Commercial High - Efficiency Single Load Clothes Washers

Traditional

Number

Type of program

Other type of program

Measured water savings (AF/Year)

Flex Track

Do you accept the Counsil's default savings number for this measure ? ○Yes○No

Council's Annual Water Savings 0.116618 AF per device

If not , Please provide the following:

Total Measured Water Savings(AF/Year)

Measure life (years)

Lifetime water savings (years)

If you are using your own water-savings measure, send your supporting spreadsheet

Enter the file name and Email to Natalie@cuwcc.org

F) Cooling Tower Conductivity Controllers.

Traditional

Number

Type of program Secect an Option

Other type of program

Measured water savings (AF/Year)

Flex Track

Do you accept the Council's default savings number for this measure ? ○Yes○No

Council's Annual Water Savings 1.032250 AF per device

If not, Please provide the following:

Total Measured Water Savings(AF/Year)

Measure life (years)

Lifetime water savings (years)

If you are using your own water-savings measure, send your supporting spreadsheet

Enter the file name and Email to Natalie@cuwcc.org

G) Cooling Tower pH Controllers

Traditional

Number

Type of program: Select an Option

Other type of program

Measured water savings (AF/Year)

Flex Track

Do you accept the Council's default savings number for this measure ? ○Yes○No

Council's Annual Water Savings 3.981543 AF per device

If not, Please provide the following:

Total Measured Water Savings(AF/Year)

Measure life (years)

Lifetime water savings (years)

If you are using your own water-savings measure, send your supporting spreadsheet

Enter the file name and Email to Natalie@cuwcc.org

H) Connectionless Food Steamers.

Traditional

Number

Type of program

Other type of program

Measured water savings (AF/Year)

Flex Track

Do you accept the Council's default savings number for this measure ? ○Yes○No

Council's Annual Water Savings 0.25 AF per Steamer Compartment

mIf not, Please provide the following:

Total Measured Water Savings(AF/Year)

Measure life (years)

Lifetime water savings (years)

If you are using your own water-savings measure, send your supporting spreadsheet

Enter the file name and Email to Natalie@cuwcc.org

I) Medical Equipment Steam Sterilizers

Flax Track

Traditional

Number

Type of program

Other type of program

Measured water savings (AF/Year)

Flex Track

Do you accept the Council's default savings number for this measure? ○Yes○No

Council's Annual Water Savings 1.538 AF per device

If not, Please provide the following:

Total Measured Water Savings(AF/Year)

Measure life (years)

Lifetime water savings (years)

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

J) Water - Efficient Ice Machines.

Traditional

Number

Type of program: Select an Option

Other type of program

Measured water savings (AF/Year)

Flex Track

Do you accept the Council's default savings number for this measure ? ○Yes○No

Council's Annual Water Savings 0.0834507 AF per device

If not, Please provide the following:

Total Measured Water Savings(AF/Year)

Measure life (years)

Lifetime water savings (years)

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

K) Pressurized Water Brooms.

Traditional

Number

Type of program: Select an Option

Other type of program

Measured water savings (AF/Year)

Flex Track

Do you accept the Council's default savings number for this measure? ○Yes○No

Council's Annual Water Savings 0.1534 AF per device

Flex Track

If not, Please provide the following:

Total Measured Water Savings(AF/Year)

Measure life (years)

Lifetime water savings (years)

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

L) Dry Vacuum Pumps.

Traditional

Number

Type of program Select an Option

Other type of program

Measured water savings (AF/Year)

Flex Track

Do you accept the Council's default savings number for this measure ? ○Yes○No

Council's Annual Water Savings 0.064 AF per device

If not, Please provide the following:

Total Measured Water Savings(AF/Year)

Measure life (years)

Lifetime water savings (years)

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

Traditional Reporting Stop Here, Do not continue

Flex Track Reporing Please Continue...

M) Industrial Process Water Use Reduction.

Number

Type of program Select an Option

Other type of program

Measured water savings (AF/Year)

Type of Process Water Reduced

If re-using water, what was the secondary use of the water? (such as pre-rince cycle or landscaping)

Total Measured Water Savings(AF/Year)

Measure life (years)

Lifetime water savings (years)

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

N) Commercial Laundry Retrofits.

Number of customers

Measured water savings (AF/Year)

Type of customer

- hotels
- campuses
- prisons
- laundromats

Lease / own machines

Lease Own Machines Both

Type of program

Select an Option

Other type of program

Total Measured Water Savings(AF/Year)

Measure life (years)

Lifetime water savings (years)

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

O) Industrial Laundry Retrofits.

Measured water savings (AF/Year)

Total Number of customers

Total Volume of laundry processed annually

Select an Option

Type of program

Select an Option

Other type of program

Total Measured Water Savings(AF/Year)

Measure life (years)

Lifetime water savings (years)

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

P) Filter Upgrades (for pools, spas, and fountains).

Number of pools upgraded

Number of spas upgraded

Number of fountains upgraded

Measured water savings (AF/Year)

Type of program

Select an Option

Other type of program

Total Measured Water Savings(AF/Year)

Measure life (years)

Lifetime water savings (years)

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

Q) Car Wash Reclamation Systems

Measured water savings (AF/Year)

	Conveyor	In-bay
Total Number of program participants (accounts)		
Total Number of vehicles washed annually		

Do you accept the Council's default savings number for this measure? ○Yes○No

Council's Annual Water Savings 0.00004607 (or 15 gals) per vehicle

If not, Please provide the following:

Total Measured Water Savings(AF/Year)	
Measure life (years)	
Lifetime water savings (years)	

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

R) Wet Cleaning.

		Measured water savings (AF/Year)
Brief description of program		

Total Measured Water Savings(AF/Year)	
Measure life (years)	
Lifetime water savings (years)	

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

S) Water Audits (To avoid double counting, do not include device/replacement water savings.)

Number of water audits by type of business

		Measured water savings (AF/Year)
Auto		
Food		
Health		
Hotels		

Manufacturing	
Membership	
Multi-use	
Office	
Religious	
Restaurant	
Retail/ Wholesale	
School	
Other (with description)	
Description of Other	

Total Measured Water Savings(AF/Year)	
Measure life (years)	
Lifetime water savings (years)	

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

T) Clean In Place (CIP) Technology (such as bottle sterilization in a beverage processing plant)

		Measured water savings (AF/Year)
Number of customers		
Type of program	Select an Option	
Other type of program		

Total Measured Water Savings(AF/Year)	
Measure life (years)	

Lifetime water savings (years)

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

U) Waterless Wok

Number

Type of program

Select an Option

Measured water savings (AF/Year)

Total Measured Water Savings(AF/Year)

Measure life (years)

Lifetime water savings (years)

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

V) Alternative On-site Water Sources (For Rain Water Harvesting, commercial rain barrels are excluded. For Foundation Drain Water, exclude permeable paving.)

Measured water savings (AF/Year)

Select type	Number	Description
☐ Cooling Condensate		
☐ Foundation Drain Water		
☐ Gray Water		
☐ Storm Water		
☐ Rain Water		
☐ Pond and Water Feature Recycling		

Total Measured Water Savings(AF/Year)

Measure life (years)

Lifetime water savings (years)

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

W) Sub - metering

Measured water savings (AF/Year)

Select type	Number	Description
☐ Condominiums		
☐ Apartments		
☐ Mobile Homes		

Do you accept the Council's default savings numbers for this measure? ○ Yes ○ No

Council's Annual Water Savings
Appartments & Condos=0.024419 AF/YR
Mobile Home = 0.056774 AF/Yr

If not, Please provide the following:

Total Measured Water Savings(AF/Year)

Measure life (years)

Lifetime water savings (years)

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

X) High Efficiency Showerheads

Measured water savings (AF/Year)

Number

Type of program Select an Option

Other type of program

Total Measured Water Savings(AF/Year)

Measure life (years)

Lifetime water savings (years)

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

Y) Faucet Flow Restrictors

Measured water savings (AF/Year)

Number

Type of program Select an Option

Other type of program

Total Measured Water Savings(AF/Year)

Measure life (years)

Lifetime water savings (years)

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

Z) Water Efficient Dishwashers

Measured water savings (AF/Year)

Select type Number

☐ Rack

☐ Conveyor

☐ Other

Description of Other

Type of program Select an Option

Other type of program

Total Measured Water Savings(AF/Year)

Measure life (years)

Lifetime water savings (years)

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

AA) Hot Water on Demand

Measured water savings (AF/Year)

Number

Type of program

Select an Option

Other type of program

Total Measured Water Savings(AF/Year)

Measure life (years)

Lifetime water savings (years)

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

BB) Pre-rinse Spray Valves of 1.3 gpm (gallons per minute) or less

Measured water savings (AF/Year)

Number

Type of program

Select an Option

Other type of program

Total Measured Water Savings(AF/Year)

Measure life (years)

Lifetime water savings (years)

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

CC) Central Flush Systems

		Measured water savings (AF/Year)
Number		
Type of program	Select an Option	
Other type of program		

Total Measured Water Savings(AF/Year)

Measure life (years)

Lifetime water savings (years)

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

Other Measures chosen by the Agency

		Measured water savings (AF/Year)
Description of program		
Sample (if applicable)		

Total Measured Water Savings(AF/Year)

Measure life (years)

Lifetime water savings (years)

If you are using your own water-savings measure, send your supporting spreadsheet
Enter the file name and Email to Natalie@cuwcc.org

The fields in red are required.

Agency name: City of Benicia

Reporting unit name (District name): City of Benicia

Reporting unit number: 6291

Primary contact:

First name: David

Last name: Wenslawski

Email: DavidW@ci.benicia.ca.us

You must enter the reporting unit number that we have on record for your agency. Click here to open a table to obtain this number.

Link to FAQs

View MOU

2010

BMP 5 Landscape

○ **Traditional** ○ **Flex Track**

For Traditional Track please answer the fields within the traditional boxes.
For Flex Track option, please answer the fileds within the flex track boxes.
You must enter all measured water savings manually. For each measure entered, upload a spreadsheet with sufficient information to show the way that water savings were measured and that the measure was adequately tracked (i.e., all relevant data was collected) - in some cases there are specific data point salso requested in form which are necessary to show that the measure was implemented as described.

Accounts with Dedicated Irrigation Meters

Traditional

Number of dedicated irrigation meter accounts	279.00
Number of dedicated irrigation meter accounts with water budgets	0.00
Aggregate water use for dedicated non-recreational landscape accounts with budgets	
Aggregate acreage assigned water budgets for dedicated non-recreational landscape accounts with budgets	0.00
Preserved water use records and budgets for customers with dedicated landscape irrigation accounts for at least four years	○ Yes ○ No

Flex Track

Water Savings from Accounts with dedicated irrigation meters with water budgets (Acre Feet)

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data)

(Enter the file name and Email file to Natalie@cuwcc.org)

Technical Assistance

Traditional

Number of Accounts 20% over-budget	0.00
Number of accounts 20% over-budget offered technical assistance	0.00
Number of accounts 20% over-budget accepting technical assistance	0.00

Measured water savings (AF/Year)

Flex Track

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data)

(Enter the file name and Email file to Natalie@cuwcc.org)

Irrigation Water Use Surveys for Mixed-use and Un-metered Accounts

Traditional

Number of mixed use and un-metered accounts	
Number of irrigation water use surveys offered (cumulative, all years)	
Number of irrigation water use surveys accepted (cumulative)	
Can your Agency estimate the amount of landscape acreage for mixed use and Un-metered accounts	○ Yes ○ No
If Yes, Aggregate acreage for mixed use and Un-metered accounts	

Measured water savings (AF/Year)

Flex Track

Esrimated water demand from acreage for mixed use and Un-metered accounts	
Annual water savings by customers receiving irrigation water savings surveys and implementing recomendations	

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data)
(Enter the file name and Email file to Natalie@cuwcc.org)

Financial Incentives

Traditional

Have you implemented and maintained an irrigation equipment retrofit incentive program? ○ Yes ○ No

Number of incentives	Dollar value of incentives	Incentive Types	Measured Water Savings (AF/YR)
		reimbursement up to 50%	

Flex Track

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data)
(Enter the file name and Email file to Natalie@cuwcc.org)

Traditional Reporting Stop Here, Do not continue
Flex Track Reporing Please Continue...

Landscape Flex Track Measure Types

1. Monitor and report on landscape water use

A) Measure landscapes and develop water budgets for customers with dedicated landscape meters. Provide timely water use reports with comparisons of water use to budget that provide customers the information they need to adjust irrigation schedules (such as faxes, twitter, etc. not included in the previous sections).

Measured water savings (AF/Year)

Enter the Number of sites with:

Dedicated Mixed Meters

Water Budgets

Landscape Measurements

Others (describe)

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data) (Enter the file name and Email file to Natalie@cuwcc.org)

B) Measure landscapes and develop water budgets for customers with Mixed Use meters. Provide timely water use reports with comparisons of water use to budget that provide customers the information they need to adjust irrigation schedules.

Measured water savings (AF/Year)

Enter the Number of sites with:

Dedicated Mixed Meters

Water Budgets

Landscape Measurements

Others (describe)

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data) (Enter the file name and Email file to Natalie@cuwcc.org)

C) Establish agency-wide water budget. (Note that: ETo based water budget in the MWELO changed in 2010 from .8ETo to .7ETo.)

Measured water savings (AF/Year)

Agency-wide total irrigated area Per-2010 (Acres)

Agency-wide totak irrigated area Post-2010 (Acres)

Amount of Water Used (AF/Acre)

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data) (Enter the file name and Email file to Natalie@cuwcc.org)

D) Establish agency-wide, sector-based irrigation goal to reduce water use, based on seasonality.

Number of minimum irrigation goal (AF/Acre)

Amount of Water Used per Period (AF/Period)

Measured water savings (AF/Year)

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data) (Enter the file name and Email file to Natalie@cuwcc.org)

2. Provide technical landscape resources and training

A) Upon customer requests, provide landscape irrigation management and landscape design information and resources: provide assistance, answer customer questions, respond to run-off and high-bill calls.

Measured water savings (AF/Year)

Enter the Number of:

Contacts In Person

Contacts over the phone

Contacts via Email

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data) (Enter the file name and Email file to Natalie@cuwcc.org)

B) Perform landscape & irrigation audits: including irrigation scheduling, plant information, and landscape area measurement.

Measured water savings (AF/Year)

Enter the Number of:

Audits conducted per year

Measurement of square footage of Turf areas

Measurement of square footage of NON Turf areas

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data)
(Enter the file name and Email file to Natalie@cuwcc.org)

C) Sponsor, co-sponsor, promote, or support landscape workshops, training, presentations and other technical educational events for homeowners and professionals: design, installation, maintenance, water management.

Enter the Number of:

Events

Participants

List Type or Title of Events

Measured water savings (AF/Year)

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data) (Enter the file name and Email file to Natalie@cuwcc.org)

D) Establish Time-of-Day Irrigation Restrictions.

Yes No

Describe Restrictions:

Measured water savings (AF/Year)

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data) (Enter the file name and Email file to Natalie@cuwcc.org)

E) Establish Day-of-Week Irrigation Restrictions. **Yes** **No**

Describe Restrictions:

Measured water savings (AF/Year)

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data)
(Enter the file name and Email file to Natalie@cuwcc.org)

---

3. Provide incentives

A) Establish Landscape budget-based rates. ◯ Yes ◯ No

Describe Rates:

Measured water savings (AF/Year)

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data) (Enter the file name and Email file to Natalie@cuwcc.org)

B) Provide incentives for conversions from mixed-use meters to dedicated landscape meters.

Number of Conversions:

Measured water savings (AF/Year)

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data) (Enter the file name and Email file to Natalie@cuwcc.org)

C) Provide incentives for installing sub-meters to separate landscape water use

Number of meters installed:

Measured water savings (AF/Year)

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data) (Enter the file name and Email file to Natalie@cuwcc.org)

D) Provide incentives for irrigation equipment upgrades that improve distribution uniformity, irrigation efficiency, or scheduling capabilities.

Select types of irrigation equipment upgrades:	Number of devices installed
☐ Controllers	
☐ Emitters	
☐ Soil moisture sensors	
☐ Pressure Regulators	
☐ Rain shut off devices	
☐ Other (describe)	

Measured water savings (AF/Year)

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data) (Enter the file name and Email file to Natalie@cuwcc.org)

E) Provide incentives for the reduction of water use over an irrigated area, or reduction in the size of the irrigated area due to replacement of turf or other high water-using plants with low water-using plants, artificial turf, or permeable surfaces.

Acreage of live turf converted to low water-using plants, artificial turf, or permeable surfaces: Acres

Measured water savings (AF/Year)

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data) (Enter the file name and Email file to Natalie@cuwcc.org)

F) Provide incentives for conversions from potable to recycled water.

Number of Conversions:

Number of Incentives:

Funds Invested:

Measured water savings (AF/Year)

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data) (Enter the file name and Email file to Natalie@cuwcc.org)

G) Provide incentives for the use of alternative sources of water in the landscape (i.e. gray water, rainwater, cisterns, etc.)

Number of Conversions:

Number of Incentives:

Funds Invested:

Measured water savings (AF/Year)

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data) (Enter the file name and Email file to Natalie@cuwcc.org)

---

4. Participate in local and regional planning and regulatory activities

A) Collaborate with planning agencies at the local and regional level, other water suppliers in the area and stakeholders in response to state or federal requirements such as the State Model Water Efficient Landscape Ordinance and AB 1881. Participate in the development, review, implementation, and enforcement of requirements for new developments. Provide water use data to planning agencies.

Measured water savings (AF/Year)

Public Information Programs List

Agency Type	Describe Involvement	If Ohter: Enter Name	Actions

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data) (Enter the file name and Email file to Natalie@cuwcc.org)

B) Establish or participate in a water conservation advisory committee or other community outreach effort to drive market transformation and exchange information about landscape water conservation with developers, community-based organizations, homeowners associations, residential customers, landscape professionals, educators, other water suppliers in region.

Yes **No**

Describe Involvement:

Measured water savings (AF/Year)

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data) (Enter the file name and Email file to Natalie@cuwcc.org)

C) Participate in regional efforts: integrated water resource management, watershed management, NPDES permit agencies, etc.

Yes **No**

Measured water savings (AF/Year)

Describe Involvement:

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data) (Enter the file name and Email file to Natalie@cuwcc.org)

---

5. Develop a holistic approach to landscape water use efficiency

A) Develop and implement a comprehensive landscape water conservation program for all customers. Target marketing efforts to those most likely to result in benefits to both customer and Agency.

Describe Program:

Measured water savings (AF/Year)

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data) (Enter the file name and Email file to Natalie@cuwcc.org)

---

6. Other Measures

A) Other Landscape Measures.

Measured water savings (Af/Year)

Describe Other Landscape Measures:

If there is Water Savings in this measure, upload the Methodology Spreadsheet (backup data) (Enter the file name and Email file Natalie@cuwcc.org)

The fields in red are required.

Agency name: City of Benicia

Division name (Reporting unit): City of Benicia

Reporting unit number: 6291

Primary contact:

First name: David

Last name: Wenslawski

Email: DavidW@ci.benicia.ca.us

2010

Service Area Population:

Non- Potable Water

If you select Other for type, enter

Own Supply Source Name	AF/YEAR	Water Supply Type	Water Supply Description
		Select a water type.	
		Select a water type.	
		Select a water type.	
		Select a water type.	
		Select a water type.	
		Select a water type.	
		Select a water type.	
		Select a water type.	
		Select a water type.	
		Select a water type.	
		Select a water type.	

Imported Supply Source Name	AF/YEAR	Water Supply Type	Water Supply Description
North Bay Aqueduct - SWP	4,636.00	Surface	
Putah South Canal	2,225.00	Surface	
Settlement Water	2,515.00	Surface	
Mojave	1,500.00	Surface	
		Select a water type.	
		Select a water type.	
		Select a water type.	
		Select a water type.	
		Select a water type.	
		Select a water type.	
		Select a water type.	

Exported Water Name	AF/YEAR	Where Exported? such as groundwater recharge, retail,
Lake Herman	239.40	Surface water storage in lake herman

The fields in red are required.

Agency name: City of Benicia

Division name (Reporting unit): City of Benicia

Reporting unit number: 6291

Primary contact:

First name: David

Last name: Wenslawski

Email: DavidW@ci.benicia.ca.us

Submit Form

Water Uses 2010

Non-Potable Billed

Customer Type	Meter Accounts	Metered Water Delivered	Un-metered Accounts	Un-metered Water Delivered	Description
Industrial	1.00	4,735.00			
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					

Non-Potable Un-Billed

Customer Type	Meter Accounts	Metered Water Delivered	Un-metered Accounts	Un-metered Water Delivered	Description
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					

The fields in red are required.

Agency name: City of Benicia

Division name (Reporting unit): City of Benicia

Reporting unit number: 6291

Primary contact:

First name: David

Last name: Wenslawski

Email: DavidW@ci.benicia.ca.us

Water Uses 2010

Potable Water Billed

Make sure to enter numbers in AF/Year.

Customer Type	Meter Accounts	Metered Water Delivered	Un-metered Accounts	Un-metered Water Delivered	Description
	8,598.00	2,898.00	0.00	0.00	
	306.00	473.00	0.00	0.00	
Commercial	543.00	418.00	0.00	0.00	
Industrial	79.00	101.00	0.00	0.00	
Dedicated Irrigation	279.00	602.00	0.00	0.00	
Other	8.00	27.00	0.00	0.00	
Other					
Other					
Other					
Other					
Other					
Other					
Other					

Potable Water Un-Billed

Customer Type	Meter Accounts	Metered Water Delivered	Un-metered Accounts	Un-metered Water Delivered	Description
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					

Appendix J

City of Benicia BMP Exemption
Application Analysis (M-Cubed)

City of Benicia BMP Exemption Application Analysis

Prepared by M.Cubed

July 8, 2005

1 Introduction

This document presents the analysis of the 2005 Best Management Practices (BMP) Exemption requests for the City of Benicia. A signatory water supplier to the Memorandum of Understanding Regarding Urban Water Conservation in California (MOU) can apply for an exemption from implementing a BMP if the supplier provides an analysis finding that the BMP would not be cost-effective (i) overall when total program benefits and costs are considered, or (ii) to the individual water supplier even after the water supplier has made a good faith effort to share costs with other program beneficiaries.[1]

In analysis performed for the 2000 Urban Water Management Plan (UWMP) Update, the City found that BMPs 1, 2, 3, 5, 6, 9, and 14 were not cost-effective and chose not to implement those programs. This analysis uses the BMP cost-effectiveness spreadsheets developed by M.Cubed and currently in the final stages of review by the CUWCC. Once again, BMPs 1, 2, 5, 6, 9 and 14 are found not cost-effective and eligible for exemption from the agency perspective. BMP 3 no longer is applicable. BMPs 2 and 6 were found to have positive total benefits, but those benefits arose from energy savings. Those BMPs either already are being implemented by the serving energy utility or should be given the relative magnitude of the benefits. Thus, the City is relieved of its obligation to make a separate effort through cost-sharing with the utility.

In the 2000 UWMP, BMPs 3 and 14 were found to warrant additional study. The City has since replaced extensive sections of its distribution network and has achieved the 10% threshold for unaccounted for losses. The City initiated a pilot program for ultra-low flow toilets with few takers. The analysis in this application shows that it is still not cost effective.

2 Description of Service Area

The city of Benicia provides water service to a population of approximately 29,000 in Solano County. Total water deliveries are around 12,900 acre-feet (AF), with treated water use of 6,800 AF. The majority of untreated water deliveries are for industrial use at the Valero refinery located in Benicia. According to the baseline data drawn from the 2000 UWMP and filed when the City signed the MOU in 2002, the City served 6,774 single family households and 3,343 multi family households. These figures have been updated as shown in Table 1 below.

[1] California Urban Water Conservation Council, "Memorandum of Understanding Regarding Urban Water Conservation in California," (Sacramento, California, 1991), Section 4.5(a).

Table 1. Households

	1990	2000	2005
Population	24,437	26,865	27,780
Single family households	7,102	8,134	7,987
Multi family households	2,465	2,582	2,823

Table 2. 2000 Water System Information

Customer Type	Meters	Water Use
Residential	7,771	3,103
Multi-residential	254	575
Commercial/Industrial	620	984
Heavy Industrial	93	154
Landscape Irrigation	53	158
Fire	18	17

Miles of pipeline: 120

3 Evaluation Methodology

The BMPs were evaluated using the BMP coverage calculators and the BMP simple cost-effectiveness tool spreadsheets developed by M.Cubed for the CUWCC. BMP coverage requirements are based on the year in which The City signed the MOU (2002). Updated demographic information from the 2000 Census was used in the BMP coverage calculators to determine the appropriate requirements for each BMP.

3.1 Value of Saved Water

The value of saved water to the City (program benefits) was based on the avoided cost to acquire, treat, and distribute water. In the case of indoor water savings, the valuation also includes the avoided cost to collect, treat, and dispose of waste water. An estimate of the City's incremental cost of supply was derived by identifying the supply source with the highest avoidable cost to the City. The variable costs of treatment, distribution and, when appropriate, wastewater treatment were then added to this to get the incremental cost of water supply. Supply sources and associated avoidable costs are listed in Table 3.

Table 3. City of Benicia Incremental Cost of Water

Source	Contract (AF)	Avg. Yield (AF)	Cost ($/AF)
Solano CWA (SWP)	17,200	7,987	$30.22[2]
1962 Vallejo agreement	1,100	935	37.55[3]
Solano Irrigation District	Negotiable	557	100[4]
Area of Origin Settlement Water	10,500	2,016	23.58[5]
Mojave WA Conjunctive Use	6,500	(2,000)[6]	95.38[7]
Highest Incremental Source Cost			$95.38
Variable Cost of Treatment			48.49
Variable Cost of Distribution			39.13
Incremental Cost of Supply			***$183.00***
Variable Cost of Wastewater			***$181.06***
Avoided Cost Benefit: Outdoor Demand Reduction			**$183.00**
Avoided Cost Benefit: Indoor Demand Reduction			**$364.06**

The City pays a fixed amount for its State Water Project (SWP) Contract through the Solano County Water Agency regardless of the level of deliveries. The incremental cost for SWP deliveries is therefore the Delta Water Rate of $23.58 per AF.[8] In 2003 the cities of Benicia, Fairfield and Vacaville entered into a settlement with the California Department of Water Resources (DWR) regarding Area of Origin claims for water delivered through the State Water Project. This so called "Area of Origin Settlement Water" is of lower priority than SWP contract water (also known as "Table A" water) and is available for delivery to the City only when "excess" conditions in the Delta permit additional exports. In years when supply conditions prevent the full delivery of the City's Table A water, the charge for delivering Settlement Water is simply the Delta Water Rate, as the City pays for a fixed amount of supply and conveyance capacity in its existing SWP contract. If the City were to take delivery of Settlement Water in

[2] Solano County Water Agency average charge based on average deliveries.

[3] The $37.55 per AF will remain in effect until 3/1/06. At that time Vallejo will review and determine if it will be increased. This supply is now taken at full delivery, and is used for reliability and water quality management.

[4] SID water is used almost exclusively for water quality purposes during winter months when the SWP water is difficult to treat. It also is used when the NBA pipeline is shutdown for maintenance and we can not receive SWP. Therefore, it is a "must-take" resource and an unavoidable cost.

[5] Benicia may take up to its total Table A allotment, including both this and its contractual amount, at the rate charged by the Solano County Water Agency for its SWP allotment. If Benicia exceeds its Table A allotment, then it pays additional capital charges equal to its full contract amount of $145.50. However, demand for SWP water by the City is not expected to exceed Table A amounts over the analytic horizon.

[6] Currently the City sends an average of 2,000 AF each year to MWA to be banked for future delivery. MWA has stored 7,500 AF to date.

[7] City of Benicia has not taken delivery of this water, and is unlikely to do so in the near future due to Area of Origin Settlement. However, the City continues to bank discretionary water deliveries.

[8] California Department of Water Resources, *Management of the State Water Project*, Bulletin 132-03 (Sacramento, California, December, 2004), Appendix B, Table B-17 and B-24.

addition to a full Table A allocation, there would be a conveyance fee of $145 to cover allocated fixed costs for a total charge of $168.58 per AF. However, particularly given its lower priority, it is unlikely at currently anticipated demand levels that the City will utilize Settlement Water over and above a full allocation of Table A water. The City currently receives on average less than half of its Table A amount directly through its contract.

The cost to bank Mojave Water Agency Conjunctive Use Storage water is $47.69 per AF. However, the cost of the water is effectively doubled because the City sends down two AF for every one that it will get in return. This raises the effective cost of the water to $95.38 per AF. Because the water sent down to MWA is originally SWP water, the added cost for SWP delivery at the same two-for-one price which would add another $41 per AF to bring the cost up to $136.38 for the MWA water. However, the SWP charge, reflected in the SCWA rates, is not an avoidable cost because the City has to pay for it whether or not the water is delivered. So when making analytical assumptions about the avoidable costs to use in the BMP analysis, the $41 AF for SWP is removed from the total cost. Thus, the avoided cost for purposes of calculating BMP cost effectiveness is $95.38 per AF.

The City's existing capacity for wastewater treatment is adequate through system buildout. However, BMP savings at specified MOU coverage levels do not provide sufficient peak-day demand reduction to alter the sizing of the expansion, should one be needed. Therefore, infrastructure avoided costs were not included as part of the analysis.

4 Analytic Assumptions

The assumptions used in the BMP cost-effectiveness spreadsheets are listed below in Table 4. Avoided cost figures are from Table 3 above. Hourly rates, including overhead, are $60 for staff and $26 for field labor. Energy costs are used in some cases to calculate societal benefits and are based on current Pacific Gas and Electric Co. rates. The real (inflation adjusted) discount rate for the City is 2.5%[9] while the real social discount rate is 2.0%. Annual real escalation rates for water and energy related costs are also assumed to be 2.0%.

Table 4. Assumptions used in cost-effectiveness analysis

Avoidable supply cost	$95.38	$/AF
Avoidable treatment costs	$48.49	$/AF
Avoidable distribution costs	$39.13	$/AF
Avoidable wastewater cost	$181.06	$/AF
Staff hourly rate (with overhead)	$60.00	$/hr
Field labor hourly rate (with overhead)	$26.00	$/hr
Natural gas cost	$1.34	$/therm
Electricity cost	$0.1299	$/kWh
Agency discount rate (real)	2.5	%
Social discount rate (real)	2.0	%
Annual escalation rates (real)	2.0	%

[9] Based on a 4.5% municipal bond yield rate for California cities with Benicia's credit rating.

5 BMP Cost-Effectiveness Analyses

5.1 BMP 1: Residential Surveys

BMP 1 implementation involves offering water conservation surveys to not less than 20% of single and multi family residential customers every two years, and completing surveys for not less 15% of single and multi family residential customers within 10 years of program initiation. Based on the 2000 service area data used in the BMP coverage calculator spreadsheets, the City would need to complete approximately 102 single family surveys and 52 multi family surveys annually over the next 10 years to implement the BMP per the MOU.

The materials provided with each survey, and costs and water savings (in gallons per day or gpd) associated with each item are shown in Table 5. Single family kits cost $37.10 and produce initial savings of 22.5 gpd while multi family kits cost $10.60 and produce initial savings of 15.5 gpd.

Table 5. Device Distribution

Unit Cost ($/item)	Unit Savings (gpd)	Item	SF			MF		
			Qty	Cost	Savings (gpd)	Qty	Cost	Savings (gpd)
8	2	Hose timer	2	$16	4	0	$0	0
5.25	1.5	Hose nozzle	2	10.5	3	0	0	0
2.75	5.5	Showerhead	2	5.5	11	2	5.5	11
1.5	1.5	Aerator	2	3	3	2	3	3
2.1	1.5	Kitchen Aerator	1	2.1	1.5	1	2.1	1.5
		Total		$37.1	22.5		$10.6	15.5

Source: 2000 City of Benicia UWMP

The cost assumptions are shown in Table 6. Field labor for the154 surveys would total $5,915 while the material costs (from Table 5) would total $4,335. With overhead and marketing costs of $6,000 the annual implementation costs total $16,505.

Table 6. BMP 1 Cost Assumptions

Item	Single Family	Multi Family	Annual Costs
Surveys	102	52	
Field hours (hrs/survey)[10]	1.25	0.5	$5,915
Material cost ($/survey)[11]	$37.10	$10.60	$4,335
Overhead			$3,000
Marketing			$3,000
Total			$16,250

The savings calculations are shown in Table 7. First year savings are 2.6 AF for the single family surveys (including landscape) and 0.9 AF for multi family surveys (not including landscape). With a decay rate of 20% total savings are 17.3 AF over 25 years.

[10] BMP Cost and Savings Study (2003)

[11] Table 5

Table 7. BMP 1 Savings Assumptions

Item	Single Family	Multi Family	
Savings per unit[12]	22.5	15.5	gpd
First year savings	2.6	0.9	AF
Savings decay[13]	20%	20%	
Total water savings	12.8	4.5	AF
Hot water use (% of savings)[14]	20%	40%	
% Gas hot water heater[15]	95%	95%	

Analysis results are shown in Table 8. Program costs are $16,250 with agency benefits of only $3,107. With an NPV of negative $13,146 and a benefit-cost ratio of 0.19, BMP 1 is not cost-effective for the City.

Table 8. BMP 1 Results

Program Present Value Costs	Agency Perspective	Society Perspective
1. Total surveys	154	154
2. Total water savings	17.3 AF	17.3 AF
3. Agency program costs	$16,250	$16,250
4. Customer program costs	NA	$0
5. Cost share	$0	NA
6. Net Program Cost	$16,250	$16,250
Program Present Value Benefits		
7. Agency supply & wastewater benefits	$3,107	$3,166
8. Environmental benefits	$0	$0
9. Customer program benefits	NA	$8,948
10. Other utility benefits	NA	$3,132
11. Total benefits	$3,107	$15,246
12. Net Present Value	**($13,144)**	**($1,004)**
13. Benefit-Cost Ratio	0.19	0.94
14. Simple Unit Supply Cost	$939 /AF	$939 /AF
15. Discounted Unit Supply Cost	$1,029 /AF	$1,012 /AF

[12] Table 5

[13] BMP Cost and Savings Study (2003)

[14] Indoor water use represents 42% of total residential water use (AWWARF 1999) and hot water represents 40% of indoor water use (William DeOreo 2000).

[15] KEMA-XENERGY (2004)

5.2 BMP 2: Residential Plumbing Retrofit

Implementation of BMP 2 requires making available low-flow showerheads, aerators, toilet displacement devices, and other water savings fixtures or devices to single and multi family residences constructed prior to 1992. The BMP requires the City to distribute these devices to not less that 10% of their single and multi family customers every two years until such time the City can demonstrate that at least 75% of residences constructed prior to 1992 have been retrofitted. To meet the MOU coverage requirement for BMP 2 the City would need to distribute retrofit kits to approximately 330 pre-1992 single family residences and 163 pre 1992 multi family residences annually for 7 years.

The materials provided with each survey, and costs and water savings (in gpd) associated with each item are shown in Table 9. Single family kits cost $37.10 and produce initial savings of 22.5 gpd while multi family kits cost $10.60 and produce initial savings of 15.5 gpd.

Table 9. BMP 2 Device Distribution

Unit Cost ($/item)	Unit Savings (gpd)	Item	SF			MF		
			Qty	Cost	Savings (gpd)	Qty	Cost	Savings (gpd)
8	2	Hose timer	2	$16	4	0	$0	0
5.25	1.5	Hose nozzle	2	10.5	3	0	0	0
2.75	5.5	Showerhead	2	5.5	11	2	5.5	11
1.5	1.5	Aerator	2	3	3	2	3	3
2.1	1.5	Kitchen Aerator	1	2.1	1.5	1	2.1	1.5
		Total		$37.1	22.5		$10.6	15.5

Source: 2000 City of Benicia UWMP

Materials cost for the program total $14,770. With overhead and marketing, total program costs are $20,170 (Table 10).

Table 10. BMP 2 Cost Assumptions

	Single Family	Multi Family	Annual Costs
Surveys	330	163	
Material cost ($/survey)[16]	$37.10	$10.60	$14,770
Overhead			$2,400
Marketing			$3,000
Total			$20,170

The analysis assumes that 54% of the kits are actually installed. Total first year savings are estimated at 4.5 and 1.5 AF for single family multi family units respectively. With a decay rate of 20% total savings over 25 years are 22.4 AF for the single family units and 7.6 for the multi family units, a total of 30 AF.

[16] Table 9

Table 11. BMP 02 Savings Assumptions

	Single Family	Multi Family	
Savings per unit[17]	22.5	15.5	Gpd
% installed[18]	54%	54%	
First year savings	4.5	1.5	AF
Savings decay[19]	20%	20%	
Total savings	22.37	7.61	AF
Hot water use (% of savings)[20]	20%	40%	
% Gas hot water heater[21]	95%	95%	

Total program costs are $20,170 with agency benefits of $5,384. With an NPV of negative $14,786 and a benefit-cost ratio of 0.27, it is not economic for The City to implement BMP 2. BMP 2 shows net positive society benefits. These arise from energy savings which are already targeted by energy efficiency programs administered by the Pacific Gas and Electric Company (PG&E) under Public Purpose Program (PPP) funding approved by the California Public Utilities Commission (CPUC).

[17] Table 9

[18] BMP Cost and Savings Study (2003)

[19] Ibid.

[20] Indoor water use represents 42% of total residential water use (AWWARF 1999) and hot water represents 40% of indoor water use (William DeOreo 2000).

[21] KEMA-XENERGY (2004), http://websafe.kemainc.com/RASSWEB

Table 12. BMP 2 Results

Program Present Value Costs	**Agency Perspective**	**Society Perspective**
1. Total devices distributed	493	493
2. Total water savings	30.0 AF	30.0 AF
3. Agency program costs	$20,170	$20,170
4. Customer program costs	NA	$0
5. Cost share	$0	NA
6. Net Program Cost	$20,170	$20,170
Program Present Value Benefits		
7. Agency supply & wastewater benefits	$5,384	$5,486
8. Environmental benefits	$0	$0
9. Customer program benefits	NA	$15,433
10. Other utility benefits	NA	$5,428
11. Total benefits	$5,384	$26,347
12. Net Present Value	**($14,786)**	**$6,177**
13. Benefit-Cost Ratio	0.27	1.31
14. Simple Unit Supply Cost	$673 /AF	$673 /AF
15. Discounted Unit Supply Cost	$737 /AF	$724 /AF

5.3 BMP 3: System Leak Detection and Audit

BMP 3 requires water suppliers to conduct full-scale system water audits consistent with AWWA guidelines if unaccounted water (UAW) as a percent of system intake exceeds 10%. The BMP also calls upon the supplier to perform distribution system leak detection when warranted and cost-effective.

The 2000 UWMP Update proposed that the City further assess this situation. The City implemented a service line replacement program to replace service lines that were leaking. The City also has a water main replacement program to replace aging mains. For 2004, the City had 6,271 AF delivered to domestic users, excluding deliveries to the refinery and to Lake Hermann. Total metered deliveries for 2004 was 5618.8 AF. The City currently estimates an 10% UAW for its domestic water deliveries, which meets the target threshold established in the MOU.

5.4 BMP 5a: Large Landscape Water Budgets

BMP 5 consists of two parts. The first part requires developing ETo-based water budgets for accounts with dedicated irrigation meters. With 233 active dedicated irrigation meters, the MOU would require The City to develop 52 budgets per year for four years. Budgets cost about $126/site to develop (CCWD 1999). Program development and management is assumed to require 30 and 20 hours of staff time annually (CUWCC 1999). Approximately 10% of the sites are expected to require a follow up survey at a cost of $720 (CUWCC 1999). The total first year costs for program implementation are $12,672 (Table 13).

Table 13. BMP 5a Cost Assumptions (First Year)

Item	No.	$/Item	Annual Costs
Budget development[22]	52	$126	$6,552
Program development[23] (hrs)	30	$60	$1,800
Program management[24] (hrs)	20	$60	$1,200
Customer follow up[25] (10%)	5.2	$720	$3,774
Total			$13,298

Irrigation metered sites use on average 579 gpd or 0.65 AF/year (Benicia billing records). Estimates of savings per site range from 20-37% (BMP Cost & Savings Study 2003). Using a savings estimate of 35%, on the high end of potential savings estimates, yields first year savings of 12 AF and total savings over 25 years of 1,070 AF.

Table 14. BMP 5a Savings Assumptions

Item	Single Family	
Average use per site[26]	579	gpd
Annual use per site	0.65	AF
Savings[27]	35%	
First year savings	12	AF
Total savings	1,070	AF

Once fully implemented, managing 210 water budgets will cost $16,298 per year for a total cost of $301,990. With saved water benefits of only $183,576, the NPV for BMP 5a is negative $118,414, a benefit-cost ratio of 0.61.

[22] CCWD 1999 as cited in BMP 05 cost-evaluation spreadsheet

[23] CUWCC 1999

[24] Ibid.

[25] Ibid.

[26] City of Benicia billing records

[27] BMP Cost & Savings Study (2003)

Table 15. BMP 5a Results

Program Present Value Costs	**Agency Perspective**	**Society Perspective**
1. Total budgets	210	210
2. Total water savings	1,070 AF	1,070 AF
3. Agency program costs	$301,990	$318,817
4. Customer program costs	NA	$20,356
5. Cost share	$0	NA
6. Net Program Cost	$301,990	$339,173
Program Present Value Benefits		
7. Agency supply & wastewater benefits	$183,576	$195,743
8. Environmental benefits	$0	$0
11. Total benefits	$183,576	$195,743
12. Net Present Value	**($118,414)**	**($143,430)**
13. Benefit-Cost Ratio	0.61	0.58
14. Simple Unit Supply Cost	$282 /AF	$317 /AF
15. Discounted Unit Supply Cost	$386 /AF	$409 /AF

5.5 BMP 5b: Large Landscape Surveys

The second part of BMP 5 involves providing large landscape surveys to not less than 15% of CII accounts with mixed-use meters within 10 years of program initiation. With 967 mixed-use meter accounts in 2000, the City would need to provide approximately 15 large landscape water surveys annually for 10 years.

Estimated program costs, presented in Table 16, are estimated at $17,880 in the first year (CUWCC 1999). This includes 220 hours of staff time to develop and monitor the survey program, and 12 hours of field work per survey.

Table 16. BMP 5b Cost Assumptions[28] (First Year)

Item	No.	$/Item	Annual Costs
Inventory of Accounts (hrs)	40	$60	$2,400
Targeting & marketing (hrs)	80	$60	$4,800
Monitoring & tracking (hrs)	100	$60	$6,000
Survey implementation (hrs)	180	$26	$4,680
Total			$17,880

The analysis assumes an average of 1.25 acres per site with an average annual water use of 3.35 AF/acre. Again using a relatively high savings estimate of 35%, the first year savings are estimated at 22 AF. A decay rate of 20% yields a total savings of 108 AF over 25 years.

[28] CCWD 1999 as cited in BMP Cost & Savings Study (2003)

Table 17. BMP 5b Savings Assumptions

Item	No.	Units
Acres per site[29]	1.25	acres
Annual use per site[30]	3.35	AF/acre
Savings[31]	35%	
First year savings	21.66	AF
Savings decay	20%	
Total savings	108	AF

Total program costs are $17,880, with benefits of $19,685 and NPV of negative $1,785, The benefit-cost ratio is 1.10. However, the net societal costs are $25,380, with benefits of $21,729, for NPV benefits of ($3,561). The benefit-cost ratio is 0.86, and BMP 5b is not cost effective to implement from a societal perspective.

Table 18. BMP 5b Results

Program Present Value Costs	**Agency Perspective**	**Society Perspective**
1. Total surveys	15	15
2. Total water savings	109.5 AF	109.5 AF
3. Agency program costs	$17,880	$17,880
4. Customer program costs	NA	7,500
5. Cost share	$0	NA
6. Net Program Cost	$17,880	$25,380
Program Present Value Benefits		
7. Agency supply & wastewater benefits	$19,665	$21,729
8. Environmental benefits	$0	$0
9. Total benefits	$19,665	$21,729
10. Net Present Value	**$1,785**	**($3,651)**
11. Benefit-Cost Ratio	1.10	0.86
12. Simple Unit Supply Cost	$163 /AF	$232 /AF
13. Discounted Unit Supply Cost	$179 /AF	$250 /AF

5.6 BMP 6 High-Efficiency Washer Rebate Programs

BMP 6 calls on water suppliers to offer to their customers cost-effective rebates for the purchase of high-efficiency washing machines. If the maximum cost-effective rebate is less than $50 per machine, the supplier is not required to implement the BMP.

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[29] Survey of water conservation coordinators

[30] California Model Water Efficient Landscape Ordinance table for Benicia http://www.owue.water.ca.gov/docs/WaterOrdIndex.cfm

[31] BMP Cost & Savings Study (2003)

If 10% of the City's residential customers participated in the program, 777 rebates would be issued. At $50 per rebate with $25 in overhead the total cost per rebate would be $75 with a total cost of $58,275.

Table 19. BMP 6 Cost Assumptions[32] (First Year)

Item	No.	$/Item	Annual Costs
Rebate	777	$50	$38,850
Overhead	777	$25	$19,425
Total		$75	$58,275

The CUWCC reliable savings estimate is 5,250 gallons per year for each high efficiency washing machine. This would produce a total of 8.8 AF per year in savings for the 777 residential customers. Assuming free ridership of 30%, the total savings over 25 years would be 131 AF.

For the customer, the energy savings can be significant. With approximately 95% of customers owning gas water heaters and 43% owning gas clothes dryers, the average savings per machine per year is $45.

Table 20. BMP 6 Savings Assumptions

Item	No.	Units
Average savings per unit[33]	5,250	gpy
First year savings	8.8	AF
Useful life	15	years
Free riders	30%	
Total savings	131	AF
Gas hot water heater[34]	95%	
Gas clothes dryers[35]	32%	

Total program costs are $58,275 with benefits of $23,124. With a NPV of negative $35,141 and an agency benefit-cost ratio of 0.40, it is not economic for the City to implement BMP 06. With the energy savings, the societal benefits are positive. However, this result implies that this measure should be implemented by PG&E through its PPP-funded energy efficiency programs upon approval by the CPUC.

[32] CCWD 1999 as cited in BMP Cost & Savings Study (2003)

[33] CUWCC reliable savings estimate from BMP cost-effectiveness spreadsheet

[34] KEMA-XENERGY (2004), http://websafe.kemainc.com/RASSWEB

[35] Ibid.

Table 21. BMP 6 Results

Program Present Value Costs	**Agency Perspective**	**Society Perspective**
1. Total rebates distributed	777	777
2. Total water savings	131.4 AF	131.4 AF
3. Agency program costs	$58,275	$58,275
4. Customer program costs	NA	NA
5. Cost share	$0	NA
6. Net Program Cost	$58,275	$58,275
Program Present Value Benefits		
7. Agency supply & wastewater benefits	$23,134	$24,051
8. Environmental benefits	$0	$0
9. Customer program benefits	NA	$520,871
10. Other utility benefits	NA	$23,796
11. Totalbenefits	$23,134	$568,718
12. Net Present Value	**($35,141)**	**$510,443**
13. Benefit-Cost Ratio	0.40	9.76
14. Simple Unit Supply Cost	$443 /AF	$443 /AF
15. Discounted Unit Supply Cost	$537 /AF	$518 /AF

5.7 BMP 9 Commercial, Industrial and Institutional Conservation Programs

BMP 9 calls upon water suppliers to provide facility water audits to not less than 10% of their commercial, industrial, and institutional (CII) customers within 10 years of program initiation. To meet this coverage requirement, the City would need to complete approximately seven audits annually for 10 years.

The lowest cost per survey presented in the BMP Cost & Savings study is $600 for an in-house analyst survey. With overhead the total annual program costs are $6,000 for the seven surveys.

Table 22. BMP 9 Cost Assumptions

Item	No.	$/Item	Annual Costs
Surveys[36]	7	$600	$4,200
Overhead	30	$60	$1,800
Total			$6,000

The BMP Cost & Savings study suggests average savings of 3.3 AF/year. However, the average use for the City's CII accounts is only 1.6 AF/year. Assuming savings of 18%, the average savings per site would be 0.29 AF/year for a total of 2.0 AF/year for the seven surveys. With a relatively low savings decay rate of 10%, the total savings over 25 years is 18.7 AF.

[36] BMP Cost & Savings Study 2003

Table 23. BMP 9 Savings Assumptions

Item	No.	Units
Avg. use per account	1.6	AF/year
Savings	18%	
Savings per account	0.29	AF/year
First year savings	2.0	AF
Savings decay	10%	
Total savings	18.71	AF

Total program costs are $6,000 with benefits of $3,310. With an NPV of negative $2,690 and a benefit-cost ratio of 0.55, it is not economic for the City to implement BMP 9.

Table 24. BMP 9 Results

Program Present Value Costs	**Agency Perspective**	**Society Perspective**
1. Total surveys	7	7
2. Total water savings	18.7 AF	18.7 AF
3. Agency program costs	$6,000	$6,000
4. Customer program costs	NA	25,186
5. Cost share	$0	NA
6. Net Program Cost	$6,000	$31,186
Program Present Value Benefits		
7. Agency supply & wastewater benefits	$3,310	$3,969
8. Environmental benefits	$0	$0
9. Customer energy benefits	NA	$0
10. Other utility benefits	NA	$2,967
11. Totalbenefits	$3,310	$6,936
12. Net Present Value	**($2,690)**	**($24,250)**
13. Benefit-Cost Ratio	0.55	0.22
14. Simple Unit Supply Cost	$321 /AF	$1,667 /AF
15. Discounted Unit Supply Cost	$378 /AF	$1,903 /AF

5.8 BMP 14 Residential ULFT Replacement

BMP 14 requires water suppliers to implement a ULFT distribution program that is at least as effective as requiring retrofit of existing residential high-flow toilets with toilets rated 1.6 gallons per flush (gpf) or less upon property resale. Alternatively, suppliers can satisfy the BMP by offering a toilet rebate to customers of at least $100. To the meet the coverage under the first alternative, the City would need to rebate approximately 3,000 toilets over 10 years.

In 2004, the City implemented a pilot ULFT replacement program targeted at multi-family residential complexes. Prior to 2004 the City did not have a ULFT program for BMP 14. The program offered a $100 rebate for each toilet that was replaced. Interest in the program was lacking and the City only gave out 13 rebates.

To match a time of sale replacement program, according to the BMP coverage calculation, the City would have to offer 186 single family and 15 multi family rebates in the first year. With a rebate of $75 and administrative costs of $40 per rebate, the total program cost would be $38,065.

Table 25. BMP 14 Cost Assumptions

Item	Single Family	Multi Family	Annual Costs
Surveys	186	145	
Rebate[37]	$75	$75	$24,825
Administration[38]	$40	$40	$13,240
Total			$38,065

With savings per toilet of 22.4 gpd for single family units and 41.2 gpd for multi family units the total first year savings are 3.7 and 5.4 AF respectively, assuming free ridership of 20%. The total savings over 25 years is 145 AF.

Table 26. BMP 14 Savings Assumptions

Item	Single Family	Multi Family	
Savings per unit[39]	22.4	41.2	gpd
Free riders	20%	20%	
First year savings	3.7	5.4	AF
Total water savings	59.7	85.6	AF

The total program costs are $38,065 with benefits of $25,234. With an NPV of negative $12,831 and a benefit cost ratio of 0.66, it is not economic for the City to implement BMP 14.

[37] BMP Cost & Savings Study 2003

[38] Ibid.

[39] CUWCC reliable savings estimate from BMP cost-effectiveness spreadsheet

Table 27. BMP 14 Results

Program Present Value Costs	**Agency Perspective**	**Society Perspective**
1. Total ULFTs distributed	331	331
2. Total water savings	145.4 AF	145.4 AF
3. Agency program costs	$38,065	$38,065
4. Customer program costs	NA	$9,268
5. Cost share	$0	NA
6. Net Program Cost	$38,065	$47,333
Program Present Value Benefits		
7. Agency supply & wastewater benefits	$25,234	$23,970
8. Environmental benefits	$0	$0
9. Other utility benefits	NA	$23,716
10. Totalbenefits	$25,234	$47,687
11. Net Present Value	**($12,831)**	**$354**
12. Benefit-Cost Ratio	0.66	1.01
13. Simple Unit Supply Cost	$262 /AF	$326 /AF
14. Discounted Unit Supply Cost	$338 /AF	$440 /AF

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