



2015 Urban Water Management Plan

for the Valley of the Moon
Water District

June 2016

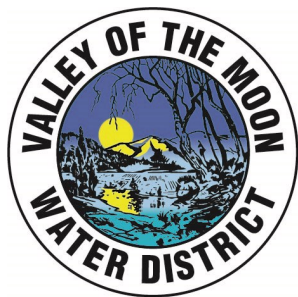
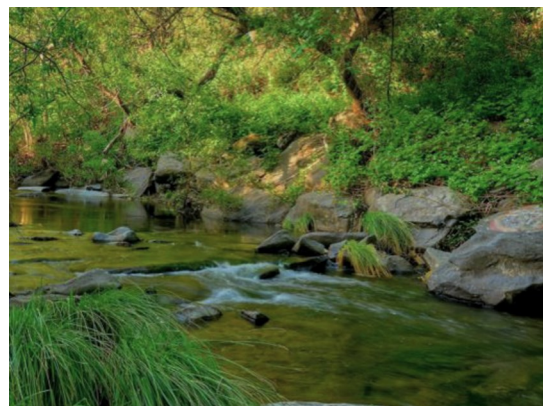


TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
1. INTRODUCTION AND PLAN PREPARATION.....	1
1.1 Compliance with the UWMP Act.....	1
1.2 UWMP Structure, Standard Units, and Basis for Reporting	2
1.3 Regional Coordination Efforts.....	3
1.3.1 Wholesale Coordination.....	4
1.3.2 Agency Coordination.....	5
1.3.3 Public Participation.....	6
1.4 Assumptions.....	7
2. SERVICE AREA AND SYSTEM DESCRIPTION.....	8
2.1 Water Service Area	8
2.2 Service Area Climate	10
2.3 Service Area Demographics	10
2.4 Current and Projected Population	11
2.5 Water Supply Infrastructure.....	11
3. SYSTEM WATER DEMANDS.....	14
3.1 Current and Historical Total Water Demand	14
3.1.1 Current and Historical Potable Water Demand	14
3.1.2 Current and Historic Non-Potable Water Demand	15
3.1.3 Distribution System Water Losses.....	16
3.2 Projected Total Water Demand.....	16
3.2.1 Projected Potable Water Demand	17
3.2.2 Water Use for Lower Income Households.....	18
3.2.3 Water Savings from Codes, Standards, Ordinances, or Transportation and Land Use Plans	19
3.2.4 Projected Non-Potable Water Demand.....	19
3.2.5 Water Use Sectors Not Included in the Demand Projections	20
3.2.6 Projected Total Water Demand.....	20
4. BASELINE WATER USE AND WATER CONSERVATION TARGETS	21
4.1 Service Area Population	21
4.2 Baseline Water Use.....	22
4.3 Water Use Targets.....	24
4.3.1 Individual Water Use Targets	24
4.3.2 Regional Water Use Targets	25
4.4 2015 Target Compliance.....	26
4.5 Water Use Reduction Plan.....	28
5. WATER SYSTEM SUPPLIES	29
5.1 SCWA Wholesale Water	29
5.1.1 SCWA Water Rights.....	29
5.1.2 SCWA Water Supply Agreement	29
5.1.3 District Entitlement.....	30
5.1.4 SCWA Transmission System.....	30
5.2 Groundwater	32
5.2.1 Groundwater Basin Description.....	33



TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
5.2.2 Groundwater Management.....	36
5.2.3 Sustainable Groundwater Management Act	38
5.2.4 Historical Groundwater Use	38
5.2.5 Projected Future Groundwater Use.....	39
5.3 Wastewater and Recycled Water	40
5.3.1 Coordination	40
5.3.2 Wastewater Collection, Treatment, and Disposal.....	40
5.3.3 Current and Projected Uses of Recycled Water.....	42
5.3.4 Comparison of Previously Projected Use and Actual Use.....	42
5.3.5 Promoting Recycled Water Use.....	43
5.4 Water Transfers.....	44
5.5 Desalinated Water Opportunities.....	44
5.6 Potential Water Supply Projects and Programs	44
5.7 Summary of Existing and Planned Sources of Water	45
6. WATER SUPPLY RELIABILITY.....	47
6.1 Constraints on Water Supplies.....	47
6.1.1 SCWA Water Shortage Allocations.....	47
6.1.2 Russian River Environmental Constraints	48
6.2 Projected Water Supply Reliability	49
6.2.1 Normal Years.....	49
6.2.2 Single Dry Years.....	50
6.2.3 Multiple Dry Years	51
6.3 Supply and Demand Assessment.....	53
6.3.1 Normal Years	53
6.3.2 Single Dry Years.....	53
6.3.3 Multiple Dry Years	54
6.4 Water Quality.....	55
6.5 Water Management Tools.....	55
7. WATER SHORTAGE CONTINGENCY PLANNING.....	56
7.1 Stages of Action.....	57
7.2 Guiding Priorities.....	57
7.3 Allocation Amounts	58
7.4 Prohibitions on End Uses.....	59
7.4.1 Defining Water Features	63
7.5 Penalties, Charges and Other Enforcement	63
7.6 Consumption Reduction Methods.....	65
7.7 Determining Water Shortage Reductions	68
7.8 Revenue and Expenditure Impacts.....	68
7.9 Water Shortage Contingency Ordinance and Resolution	71
7.10 Catastrophic Supply Interruption Plan.....	71
7.11 Estimate of Minimum Supply for Next Three Years.....	72
7.12 Water Shortage Contingency Plan Implementation.....	73
8. DEMAND MANAGEMENT MEASURES.....	74



TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
8.1 Regional Water Conservation	74
8.2 District Water Conservation	78
8.2.1 DMM 1 – Water Waste Prevention Ordinances	79
8.2.2 DMM 2 – Metering.....	79
8.2.3 DMM 3 – Conservation Pricing.....	80
8.2.4 DMM 4 – Public Education Outreach	81
8.2.5 DMM 5 – Programs to Assess and Manage Distribution System Real Loss.....	82
8.2.6 DMM 6 – Water Conservation Program Coordination	83
8.2.7 DMM 7 – Other DMMs.....	83
8.3 Implementation over the Past Five Years	85
8.4 Planned Implementation to Achieve Water Use Targets	85
9. PLAN ADOPTION AND SUBMITTAL	87
9.1 Notification of UWMP Preparation	87
9.2 Notification of Public Hearing.....	87
9.2.1 Notice to Cities and Counties	87
9.2.2 Notice to the Public.....	88
9.3 Public Hearing and Adoption.....	88
9.4 Plan Submittal	88
9.5 Public Availability	89
10. REFERENCES	90

TABLES

Table 1.1	Public Water Systems (DWR Table 2-1)
Table 1.2	Plan Identification (DWR Table 2-2)
Table 1.3	Agency Identification (DWR Table 2-3)
Table 1.4	Water Supplier Information Exchange (DWR Table 2-4)
Table 1.5	Notification to Cities, Agencies, and Counties (DWR Table 10-1)
Table 1.6	Public Participation and Outreach
Table 2.1	Municipal Production Wells
Table 2.2	Climate Characteristics
Table 2.3	Population – Current and Projected (DWR Table 3-1)
Table 3.1	Demands for Potable and Raw Water – Actual (DWR Table 4-1)
Table 3.2	12 Month Water Loss Audit Reporting (DWR Table 4-4)
Table 3.3	Demands for Potable and Raw Water – Projected (DWR Table 4-2)
Table 3.4	Inclusion in Water Use Projections (DWR Table 4-5)
Table 3.5	Projected Water Use for Lower Income Households
Table 3.6	Projected Water Savings due to Passive Conservation
Table 3.7	Current and Projected Total Water Demands (DWR Table 4-3)
Table 4.1	SBx7-7 Service Area Population (DWR SBx7-7 Table 3)
Table 4.2	Individual SBx7-7 Baselines and Targets Summary (DWR Table 5-1)
Table 4.3	Regional SBx7-7 Baselines and Targets Summary (DWR Table 5-1)
Table 4.4	Individual 2015 SBx7-7 Compliance (DWR Table 5-2)

TABLES (Continued)

Table 4.5	Regional 2015 SBx7-7 Compliance (DWR Table 5-2)
Table 5.1	Groundwater Volume Pumped (DWR Table 6-1)
Table 5.2	Projected Future Groundwater Production
Table 5.3	Wastewater Collected within Service Area in 2015 (DWR Table 6-2)
Table 5.4	Wastewater Treatment and Discharge within Service Area in 2015 (DWR Table 6-3)
Table 5.5	Current and Projected Recycled Water Direct Beneficial Uses within Service Area (DWR Table 6-4)
Table 5.6	2010 UWMP Recycled Water Use Projection Compared to 2015 Actual (DWR Table 6-5)
Table 5.7	Methods to Expand Future Recycled Water Use (DWR Table 6-6)
Table 5.8	Expected Future Water Supply Projects or Programs (DWR Table 6-7)
Table 5.9	Water Supplies – Actual (DWR Table 6-8)
Table 5.10	Water Supplies – Projected (DWR Table 6-9)
Table 6.1	SCWA Projected Supply and Demand, Normal Years
Table 6.2	District Projected Water Supplies, Normal Years
Table 6.3	SCWA Projected Supply and Demand, Single Dry Years
Table 6.4	District Projected Water Supplies, Single Dry Years
Table 6.5	SCWA Projected Supply and Demand, Multiple Dry Years
Table 6.6	District Projected Water Supplies, Multiple Dry Years
Table 6.7	Normal Year Supply and Demand Comparison (DWR Table 7 2)
Table 6.8	Single Dry Year Supply and Demand Comparison (DWR Table 7 3)
Table 6.9	Multiple Dry Years Supply and Demand Comparison (DWR Table 7 4)
Table 7.1	Stages of Water Shortage Contingency Plan (DWR Table 8-1)
Table 7.2	WSCP Reduction Goals by Customer Class
Table 7.3	Restrictions and Prohibitions on End Uses (DWR Table 8-2)
Table 7.4	Procedure for Imposing Administrative Fees
Table 7.5	Stages of Water Shortage Contingency Plan - Consumption Reduction Methods (DWR Table 8-3)
Table 7.6	Water Shortage Charges
Table 7.7	Impact of Water Shortage on Revenues and Expenditures
Table 7.8	Emergency Operations Plan Summary
Table 7.9	Minimum Supply Next Three Years (DWR Table 8-4)
Table 8.1	Volumetric Water Rates, 2015

FIGURES

Figure 2.1	District Service Area
Figure 2.2	Water Supply Infrastructure
Figure 5.1	SCWA Service Area and Water Transmission System Facilities
Figure 5.2	Groundwater Basins in the Vicinity of the District Service Area

**VALLEY OF THE MOON WATER DISTRICT
2015 URBAN WATER MANAGEMENT PLAN**



APPENDICES

Appendix A	UWMP Checklist
Appendix B	Public Outreach Documentation
Appendix C	Water Demand Analysis and Water Conservation Measures Report
Appendix D	AWWA Water Loss Spreadsheet (2015)
Appendix E	SBX7-7 Compliance
Appendix F	Regional Alliance SBx7-7 Compliance
Appendix G	2015 Water Shortage Contingency Plan
Appendix H	Draft Resolution Adopting Stage of WSCP
Appendix I	SMSWP Annual Report 2014-2015
Appendix J	Water Waste Prohibition – Ordinance No. 1007
Appendix K	Board Resolution Adopting the 2015 UWMP
Appendix L	Plan Submittal Documentation

1. INTRODUCTION AND PLAN PREPARATION

In 1983, the California Legislature enacted the Urban Water Management Planning Act (“UWMP Act”) (California Water Code [“CWC”] §10610 - §10657). The UWMP Act states that every urban water supplier that provides water to 3,000 or more connections, or that provides over 3,000 acre-feet of water per year (“AFY”) should make every effort to ensure the appropriate level of water service reliability to meet the needs of its customers during normal, dry, and multiple dry years. Historically, the UWMP Act required urban water suppliers to update their Urban Water Management Plan (“UWMP” or “Plan”) for submittal to the Department of Water Resources (“DWR”) in years ending in five and zero. However, because of recent changes in UWMP Act requirements, State law has extended the deadline for the 2015 Plans to 1 July 2016. On behalf of the Valley of the Moon Water District (“District”), Erler & Kalinowski, Inc. (“EKL”) has prepared this 2015 update to District’s UWMP in accordance with the UWMP Act.

1.1 COMPLIANCE WITH THE UWMP ACT

10620. (b) Every person that becomes an urban water supplier shall adopt an urban water management plan within one year after it has become an urban water supplier.

As shown in Table 1.1, the District served 6,884 connections in 2015 and is therefore subject to the requirements of the UWMP Act.

Table 1.1 – Public Water Systems (DWR Table 2-1)

Public Water System Number	Public Water System Name	Number of Municipal Connections 2015	Volume of Water Supplied in 2015 (AFY)
CA4910013	Valley of the Moon Water District	6,884	2,529

The District’s 2015 UWMP describes how the current and future water resources and demands within the District’s service area will be managed to provide an adequate and reliable water supply. Additionally, and as applicable, the District’s 2015 UWMP reflects the following significant revisions to the UWMP Act that have been made since 2010:

- Demand Management Measures – CWC §10631(f)(1) and (2) Assembly Bill (“AB”) 2067 (2014);
- Submittal Date – CWC §10621(d) and AB 2067 (2014);
- Electronic Submittal – CWC §10644(a)(2) and AB 2067, 2014;
- Standardized Forms – CWC §10644(a)(2) and AB 2067, 2014;
- Water Loss – CWC §10631(e)(1)(J) and (e)(3) and Senate Bill (“SB”) 1420 (2014);



- Estimating Future Water Savings – CWC Section 10631(e)(4) and SB 1420 (2014);
- Voluntary Reporting of Energy Intensity – CWC §10631.2(a) and (b) SB 1036 (2014); and
- Defining Water Features – CWC Section 10632(b) and AB 2409 (2010).

Further, Senate Bill x7-7 (“SBx7-7”), which was passed by the California legislature and approved by the Governor in 2009, amended the UWMP Act to require a 20 percent statewide reduction in urban potable water use by the year 2020. In the 2010 UWMPs, each water supplier determined a baseline per capita water use and established per capita water use targets for 2020, as well as an interim water savings target to be met by 2015. For the current 2015 UWMP, water suppliers must demonstrate their progress towards meeting the requirements of SBx7-7, and may adjust baseline water use values and water use targets to reflect more recent data.

1.2 UWMP STRUCTURE, STANDARD UNITS, AND BASIS FOR REPORTING

As indicated in Table 1.2, the District’s 2015 UWMP has been prepared individually for the District in general accordance with the format suggested in DWR’s *2015 Urban Water Management Plans Guidebook for Urban Water Suppliers*, dated March 2016 (“Guidebook”; DWR, 2016a)¹. Some sections of the outline presented in the Guidebook have been combined or arranged in a different order, but all the information requested in the UWMP Guidebook and Act is provided within this document (see the checklist included in Appendix A).

Table 1.2 – Plan Identification (DWR Table 2-2)

☒	Individual UWMP
☐	Regional UWMP (RUWMP)
NOTES: As described in Section 4.3.2, the District participates in a regional alliance (Sonoma-Marín Water Savings Partnership) for the purposes of SBx7-7 compliance reporting. However, this UWMP has been prepared individually for the District.	

As summarized in Table 1.3, unless otherwise indicated, the data included in the following sections is presented in units of acre-feet (“AF”) or acre-feet per year (“AFY”); annual values represent fiscal years (“FY”) spanning from 1 July to 30 June of the following year. As such, “2015” represents FY 2014-15, and so forth.

¹ The Guidebook can be accessed via the following link: http://www.water.ca.gov/urbanwatermanagement/docs/2015/UWMP_Guidebook_Mar_2016_FI_NAL.pdf, as accessed March 2016.



Table 1.3 – Agency Identification (DWR Table 2-3)

Type of Agency (select one or both)	
☐	Agency is a wholesaler
☒	Agency is a retailer
Fiscal or Calendar Year (select one)	
☐	UWMP Tables Are in Calendar Years
☒	UWMP Tables Are in Fiscal Years
If Using Fiscal Years Provide Month and Day that the Fiscal Year Begins (dd/mm)	
01/07	
Units of Measure Used in UWMP (select from Drop down)	
Unit	AF

Text from the UWMP Act has been included in justified, italicized font at beginning of relevant sections of this UWMP. The information presented in the respective UWMP sections and the associated text, figures, and tables are collectively intended to fulfill the requirements of that sub-section of the UWMP Act. To the extent practicable, supporting documentation has also been provided in Appendices A through L. Other sources for the information contained herein are provided in the references section of this document.

Per CWC §10644(a)(2), selected information for the 2015 UWMP updates must be presented in standardized tables for electronic submittal to DWR. The tables presented in this UWMP have been re-numbered, but the content has been preserved and the original DWR table numbers are included in parentheses in the table titles.

1.3 REGIONAL COORDINATION EFFORTS

This section describes the various agencies, districts and stakeholders that were involved with, or contributed information to support, the preparation of this UWMP. Documentation of public outreach conducted as part of the development of this Plan is included in Appendix B.

1.3.1 Wholesale Coordination

10631. (j) An urban water supplier that relies 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).

The District meets regularly with other water purveyors in regards to water supply and demand planning. In particular, the District meets at least monthly with its water wholesaler, the Sonoma County Water Agency ("SCWA"), and with other Water Contractors who purchase water from the SCWA. These monthly meetings occur through the District's participation in the SCWA Technical Advisory Committee ("TAC"). The primary mission of the TAC is to provide input and guidance to the SCWA regarding technical issues that may have an impact on the Water Contractors (i.e., UMWP coordination, capital projects, operational changes, etc.). Additionally, the District participates in quarterly meetings of the Water Advisory Committee ("WAC"). The WAC's objectives are to advise the SCWA's Board of Directors on policy and fiscal matters affecting the Water Contractors. The District's participation in the TAC and WAC has been instrumental in coordinating water supply and demand analyses for the preparation of this Plan. The District meets more often with the City of Sonoma, also a Water Contractor to the SCWA, because of its shared delivery system through the SCWA aqueduct system, which transports water from the Russian River to Sonoma Valley.

The District's water supply primarily comes from water purchased from the SCWA. The District, along with seven other Water Contractors, has a water supply agreement with the SCWA for the purchase of Russian River water commonly referred to as the *Restructured Water Supply Agreement*. As indicated in Table 1.4, the District has provided demand projections through 2040 to the SCWA.²

Table 1.4 – Water Supplier Information Exchange (DWR Table 2-4)

The retail supplier has informed the following wholesale supplier(s) of projected water use in accordance with CWC 10631.
Wholesale Water Supplier Name
Sonoma County Water Agency

As discussed in Section 3.2.1, the District's projected water demands were developed as part of 2015 planning effort that was implemented in coordination with SCWA and the other Water

² Email from the District to SCWA dated 10 October 2015.



Contractors (i.e., the Maddaus Demand Analysis included as Appendix C). The SCWA was provided with the District’s water use projections through this process. The District will continue to coordinate with the SCWA to determine the timing of capital improvement projects that may need to be implemented in order to meet the District’s projected future water demands.

Additionally, as described in more detail in Section 6, the District has relied upon the water supply reliability projections provided by SCWA for the purposes of analyzing the reliability of its Russian River water supplies during normal and dry years through 2040.³

1.3.2 Agency Coordination

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.

As part of the development of this plan, the District coordinated closely with the other seven SCWA Water Contractors. Among other methods, this coordination occurred through regular meetings of the TAC and WAC (see Section 1.3.1). These agencies also coordinate as part of the regional water conservation partnership, the Sonoma-Marín Saving Water Partnership (“SMSWP”). The agencies, cities, and counties that were notified by the District during the development of this Plan are listed in Table 1.5. A sample copy of the notices is provided in Appendix B.

³ Email from SCWA dated 11 April 2016.

Table 1.5 – Notification to Cities, Agencies, and Counties (DWR Table 10-1)

Agency, City, or County Name	60 Day Notice	Notice of Public Hearing
<i>Cities</i>		
City of Sonoma	☒	☒
City of Santa Rosa	☒	☒
City of Rohnert Park	☒	☒
City of Cotati	☒	☒
City of Petaluma	☒	☒
Town of Windsor	☒	☒
<i>Agencies</i>		
Marin Municipal Water District	☒	☒
North Marin Water District	☒	☒
SCWA	☒	☒
<i>Counties</i>		
Sonoma County	☒	☒

The District also coordinated with the wastewater agency serving the District’s service area, the Sonoma Valley County Sanitation District (“SVCSD”) as part of the preparation of this Plan.

1.3.3 Public Participation

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

Water suppliers are required by the Act to encourage active involvement of the community within the service area prior to and during the preparation of its UWMP. The Act also requires water suppliers to make a draft of the UWMP available for public review and to hold a public hearing regarding the findings of the UWMP prior to its adoption. In addition to sending notices to the various agencies listed in Table 1.5, the District also included a public notice in the local newspaper notifying the public of the District’s intent to prepare its UWMP. The notice asked for public input during the preparation of the UWMP. Public participation in the development of the District’s 2015 UWMP is summarized in Table 1.6.

Table 1.6 – Public Participation and Outreach

Date	Participation or Outreach Action	Comments
23 February 2016	Public Notice of UWMP Preparation #1	Sonoma Index Tribune
29 February 2016	Notice of UWMP Preparation to Interested Parties	Mailed Letter
24 May 2016	Draft 2015 UWMP released	Available at District Office
24 May 2016	Notice of Public Hearing #1	Sonoma Index Tribune
27 May 2016	Notice of Public Hearing #2	Sonoma Index Tribune
7 June 2016	Public Hearing	Board Meeting

The Public Review Draft 2015 UWMP was available for public review at the District’s office and on the District’s website (www.vomwd.com).

1.4 ASSUMPTIONS

This Plan was prepared by EKI in close coordination with District staff to ensure that the information provided herein is accurate and reflects the best available data and knowledge. The evaluation and projections in this document are based on the District’s current understanding of its service area population, predicted water demands, water supply contract with the SCWA, and its planned (future) water supply projects. This document is a “living” document that is intended to be updated every five years. As the District’s water supply and demand picture changes, an updated UWMP will incorporate those changes accordingly.

Further, much of the data and analysis presented in Section 3.2 and Section 8 of this Plan was conducted by Maddaus Water Management in a report entitled *2015 Urban Water Management Plan Water Demand Analysis and Water Conservation Measures Update* (“Maddaus Demand Analysis”; Maddaus, 2015). Excerpts and data from the Maddaus Demand Analysis are directly used at times, with permission of the District. A copy of the Maddaus Demand Analysis can be found in Appendix C.



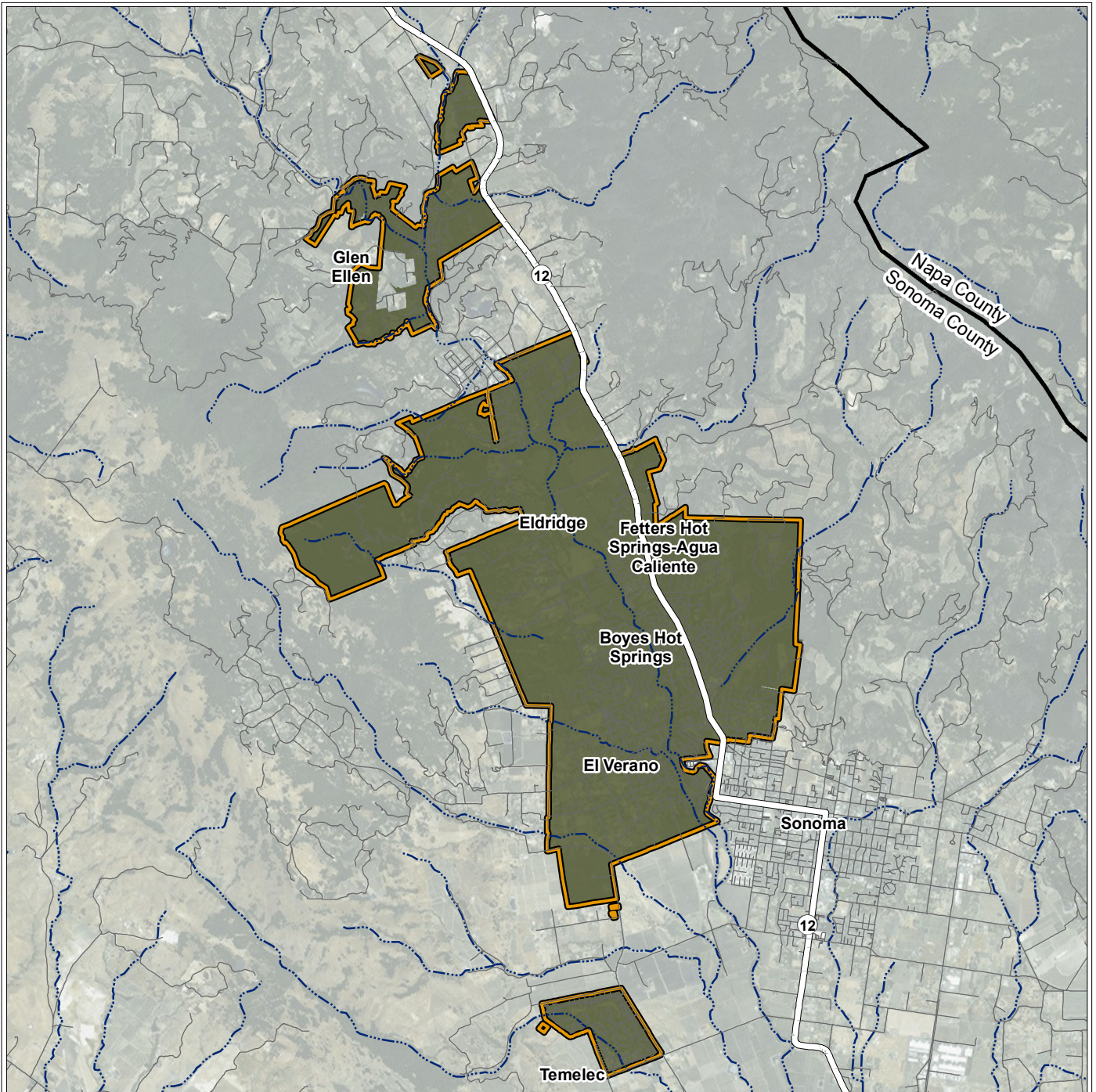
2. SERVICE AREA AND SYSTEM DESCRIPTION

*10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:
10631. (a) Describe the service area of the supplier, including current and projected population, climate, and other demographic factors affecting the supplier's water management planning. The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is available.*

This section describes the physical characteristics of the District's water service area as well as current and projected population for the service area.

2.1 WATER SERVICE AREA

The District's service area is located in Sonoma County, approximately 50 miles north of San Francisco, and is adjacent to the City of Sonoma. As shown in Figure 2.1, the District's water service area extends from the Trinity Oaks Subdivision in the north to the Temelec Subdivision in the south. The service area encompasses approximately 11.8 square miles and includes residential and commercial customers. Elevations in the service area range from approximately 90 feet above mean sea level to approximately 1,190 feet above mean sea level.



Legend

- VOMWD Service Area
- Sphere of Influence
- County
- Highway
- Road
- Stream

Sources

Aerial base map provided by ArcGIS Online (ESRI, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, AEX, Getmapping, Aerigrid, IGN, IGP, swisstopo, and the GIS User Community), obtained 6 May 2016.

Abbreviations

VOMWD = Valley of the Moon Water District

Notes

1. All locations are approximate.
2. Service area and sphere of influence data were provided by VOMWD on 25 March 2016.

DRAFT

Erler & Kalinowski, Inc.

District Service Area Map

Valley of the Moon Water District
2015 Urban Water Management Plan
Sonoma County, CA
May 2016

EKI B50100.00

Figure 2.1



0 7,000 14,000



(Approximate Scale in Feet)

2.2 SERVICE AREA CLIMATE

The District’s service area has a climate that is typical of the Napa and Sonoma County areas, characterized by summers that are dry and warm, and winters that are relatively mild with the majority of rainfall occurring during this season. The regional averages for reference evapotranspiration (“ET_o”), rainfall, and temperature are summarized in Table 2.2.

Table 2.2 – Climate Characteristics

Month	Reference Evapotranspiration, ET _o (a) (inches)	Average Rainfall (b) (inches)	Average Temperature (b)	
			Min (°F)	Max (°F)
January	1.0	6.14	37.2	57.2
February	1.6	5.27	39.9	63.2
March	3.0	4.05	40.8	66.4
April	4.5	1.77	42.3	71.2
May	5.6	0.82	46	77.2
June	6.6	0.23	49.7	84.1
July	7.1	0.03	51.2	88.6
August	6.3	0.08	50.8	88.2
September	4.7	0.33	49.3	86.3
October	3.3	1.67	45.5	78.6
November	1.5	3.85	40.6	65.9
December	1.0	5.18	37.1	57.5
Annual	46.1	29.4	44.2	73.7

- (a) Reference evapotranspiration data for Valley of the Moon from Appendix A California Code of Regulations, Title 23, Division 2, Chapter 2.7, Model Water Efficient Landscape Ordinance, 15 July 2015.
- (b) Precipitation and temperature data for the Sonoma Climate Station (048351) from the Western Regional Climate Center for the period 1 January 1893 through 31 December 2014.

2.3 SERVICE AREA DEMOGRAPHICS

The demographics of the District’s customers include a wide range of income, household size and water demands. Typically, the more affluent households are located along the foothills and are characterized by larger lots and homes with higher water demands for irrigation. On the other end of the spectrum, there are two disadvantaged communities located within the District which tend to have smaller lots and lower water use.

Due to the District’s service area being located in heart of a tourist destination, Sonoma Valley, another factor impacting water use in recent years has been the increase in the number of second homes and vacation rentals. These accounts tend to have higher water use because the sites do

not have fulltime owners looking for leaks and managing irrigation water use in accordance with weather patterns.

2.4 CURRENT AND PROJECTED POPULATION

The calculation of 2015 population was performed using a persons-per-connection method that complies with the requirements of SBx7-7, as discussed in Section 4.1. A population estimate was obtained by compiling population estimates from the 2010 Census for each Census Block contained in the District's service area. This aggregate population estimate (23,636) was compared to the total number of service connections in 2010 (6,841) to determine the number of persons per connection (3.455). This persons-per-connection factor for the most recent Census year was then multiplied by the number of service connections in 2015 (6,884) to estimate the service area population. Using this methodology, the District's 2015 service area population was estimated to be 23,782.

For planning purposes, the District relied on population and employment projections based on the 2005 Sonoma County General Plan. A copy of the 2005 Sonoma County General Plan can be found at the following website link: <http://www.sonoma-county.org/prmd/docs/gp/>. This document is the most recent planning document available for unincorporated areas of Sonoma County, which the District serves, and has been tracking closely to actual population and number of new connections per year.

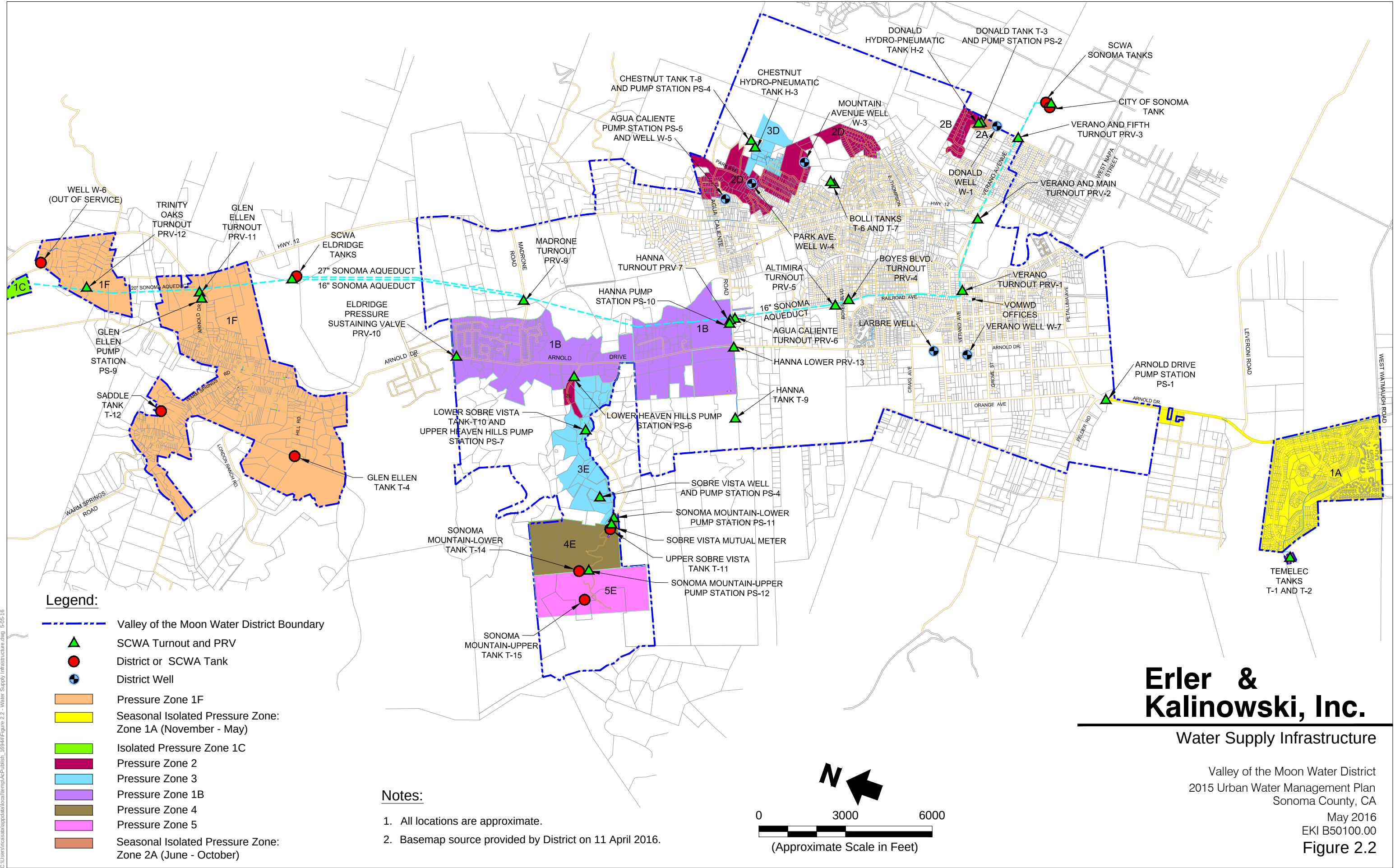
The District's current and projected service area population is summarized in Table 2.3.

Table 2.3 – Population – Current and Projected (DWR Table 3-1)

	2015	2020	2025	2030	2035	2040(opt)
Population Served	23,782	24,873	25,229	25,586	25,943	26,300
NOTES: The 2015 population is calculated based upon a persons-per-connection method, as discussed in Sections 2.4 and 4.1. Projected populations are based on Sonoma County Draft General Plan 2005 estimates, as summarized in Section 2.4 and included in the Maddaus Demand Analysis in Appendix C.						

2.5 WATER SUPPLY INFRASTRUCTURE

The District's water supply infrastructure is presented on Figure 2.2. The District's water supply is conveyed through ten turnouts from the Sonoma Aqueduct, which is owned and operated by the SCWA. These ten turnouts are spread along the aqueduct from just north of Trinity Road and Highway 12 south to Verano Avenue and Fifth Street West near the City of Sonoma. The District's distribution system contains approximately 92 miles of water mains ranging in size from less than 2 inches to 14 inches in diameter. More than 75 percent of water mains are either 6 or 8 inches in diameter, and more than 95 percent are between 4 and 12 inches in diameter. Most of the small diameter mains have been replaced in the past 10 years due to an aggressive capital improvement program which is still ongoing.





The District's water distribution system has eleven pressure zones. The majority of the District's customers that are located on the valley floor are served from the SCWA aqueduct pressure while customers in the higher elevations of the Sonoma Valley are served by separate pressure zones.

To help balance pressure zones and water demands the District has the following infrastructure assets:

- 10 turnouts from the SCWA aqueduct;
- 7 groundwater wells;
- 10 pumping stations; and
- 15 storage tanks.

Additional summary information pertaining to the District's water system facilities can be found in the District's Master Water Plan (Brelje & Race, 2007).

The District owns and/or operates a total of seven municipal production wells, five of which are currently active, with capacities ranging from 90 gallons per minute ("gpm") to 250 gpm. The District's groundwater wells are summarized in Table 2.1.

Table 2.1 – Municipal Production Wells

Well Name	Well ID	Owner	Capacity (gpm)	Status
Agua Caliente	4910013-001	District	120	Active
Donald Avenue	4910013-002	District	110	Active
Larbre	4910013-003	Leased	110	Active
Mountain Avenue	4910013-004	District	110	Active
Park Avenue	4910013-005	District	90	Active
Trinity Oaks	4910013-006	District	N/A	Inactive
Verano Avenue	4910013-019	District	N/A	Inactive



3. SYSTEM WATER DEMANDS

*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.*
- (I) Agricultural.*
- (J) Distribution system water loss.*

10631. (e) (2) The water use projections shall be in the same five-year increments described in subdivision (a).

For the purposes of this UWMP, potable water demand is defined to be the volume of water produced by the District, including purchased SCWA water and groundwater pumped by the District. Among other things, water demand is dependent on climate, population, industry, and the types of development present in a community. Sections 3.1 and 3.2 describe the District's historical and projected water uses for residential, commercial, institutional, and landscape irrigation purposes (water use sectors A, B, C, E, and F, per CWC §10631(e)(1)). Water use sector J is discussed in Section 3.1.3. As described in Section 3.2.5, this discussion does not include demands for water use sectors D, G, H, and I as they are not applicable or present within the District's service area.

3.1 CURRENT AND HISTORICAL TOTAL WATER DEMAND

The following section of the UWMP presents the District's historical and current water demands, as well as the projected future demand in 5-year increments between 2020 and 2040.

3.1.1 Current and Historical Potable Water Demand

Current and historical potable water use over the five-year period 2011 through 2015, including water use by individual customer sectors, is presented in Table 3.1.

Water demand within the District's service area is measured using water meters that are installed at each customer account. Records of current and historical water use at each account are maintained by the District and are based on billing data. Water demand within the District's service area is tracked and reported on a bi-monthly basis for the following sectors:

- Single Family Residential ("SFR");
- Multi-Family Residential ("MFR");



- Commercial;
- Institutional; and
- Landscape.

Water use in the District's service area is predominantly associated with residential use. Residential customers account for approximately 79 percent of the total water deliveries, with SFR use accounting for 61 percent and MFR accounting for 18 percent. Commercial and institutional accounts represent 7 percent and 3 percent of total use, respectively. Landscape accounts account for the smallest percentage of water deliveries at 2 percent of total.

Table 3.1 – Demands for Potable and Raw Water - Actual (DWR Table 4-1)

Use Type	Historical Water Demand (AFY)					
	Level of Treatment When Delivered	2011	2012	2013	2014	2015
Single Family	Drinking Water	1,643	1,693	1,853	1,830	1,547
Multi-Family	Drinking Water	466	503	529	515	456
Commercial	Drinking Water	179	179	187	182	175
Landscape	Drinking Water	44	43	47	58	41
Institutional/Governmental	Drinking Water	81	108	102	100	80
Losses	Drinking Water	320	360	324	344	229
TOTAL		2,733	2,886	3,042	3,029	2,528

NOTES: The District does not provide raw water.

3.1.2 Current and Historic Non-Potable Water Demand

The District does not supply non-potable water, but is currently investigating recycled water options, as discussed further in Section 5.3. No non-potable water demand projections are available at this point in time.

3.1.3 Distribution System Water Losses

10631. (e) (3) (A) For the 2015 urban water management plan update, the distribution system water loss shall be quantified for the most recent 12-month period available. For all subsequent updates, the distribution system water loss shall be quantified for each of the five years preceding the plan update.

10631. (e) (3) (B) The distribution system water loss quantification shall be reported in accordance with a worksheet approved or developed by the department through a public process. The water loss quantification worksheet shall be based on the water system balance methodology developed by the American Water Works Association.

Distribution system water losses are defined in the Guidebook to be: “the physical water losses from the water distribution system and the supplier’s storage facilities, up to the point of customer consumption.” The total differential between water supply and metered water use is presented in Table 3.1 as “Losses.” However, this category includes unbilled water uses such as system flushing, leak repair flushing, hydrant leaks, and street sweeping. In order to isolate the water loss attributed to the distribution system, the District routinely performs the American Water Works Association (“AWWA”) Water Loss Worksheet (“M36”). This analysis separates water loss into “apparent” and “real” losses. Apparent losses include metering inaccuracies, systematic data handling errors, and unauthorized consumption. Real losses represent water loss attributable to the distribution system and include physical water losses from the pressurized system and storage tanks up to the point of customer consumption. The real losses calculated in the most recent AWWA Water Loss Worksheet is provided in Table 3.2 and the full analysis is included in Appendix D.

Table 3.2 – 12 Month Water Loss Audit Reporting (DWR Table 4-4)

Reporting Period Start Date (mm/yyyy)	Volume of Water Loss (AFY)
07/2014	68
NOTES: Water loss is the “real losses” value calculated in the District's 2015 AWWA Water Loss Worksheet, included in Appendix D.	

In 2015, the District’s real losses were calculated to be 68 AF, approximately 2.7% of the total volume of water supplied. The District actively manages its distribution system to minimize leakage through actions such as managing system-wide pressures to prevent pressure spikes, installing permanent acoustic leak sensors and repairing all known leaks immediately.

3.2 PROJECTED TOTAL WATER DEMAND

The District’s water demand projections were conducted as part of the Maddaus Demand Analysis (see Appendix C). As discussed in Section 2.4, the land use and population assumptions that underpin the water use projections are based on the 2005 Sonoma County General Plan



(“General Plan”). The population and job forecasts provided in the General Plan were relied upon for the demand projections conducted in the Maddaus Demand Analysis.

Projected total water demand is discussed in detail in the following subsections.

3.2.1 Projected Potable Water Demand

For purposes of developing water use projections, the Maddaus Demand Analysis used a planning estimate for the year 2015 and not the actual billing data presented in Table 3.1. The 2015 planning estimate is then used as a “take-off” point from which future demand projections are based. A planning estimate was utilized because actual 2015 water demand was significantly suppressed due to water conservation that occurred in response to the historic drought of 2012 through 2015. The 2015 planning estimate utilized by the Maddaus Demand Analysis was based on the average water use over the eight-year period from 2006 to 2013. As a result, between 2015 and 2020 the District’s potable water demand is expected to increase by approximately 23%, from 2,529 AF to 3,121 AF. This increase reflects a potential rebound from the drought-suppressed water demands in 2015.

Following the rebound in potable water demand, the District is estimating that future total water demand will plateau and remain relatively stable, despite additional population and economic growth. Specifically, between 2020 and 2040, potable water demand is projected to decrease by 5 AFY, or less than 1 percent. This projection reflects an anticipated sustained decrease in per capita water use as a result of continued investment in water efficiency improvements by the District and its customers.

Projected customer water demands for years 2020 through 2040 are presented in Table 3.3. These projected demands are broken down by sector, including water loss. As indicated in Table 3.4, the water use projections presented in Table 3.3 include assumptions about future water savings due to passive conservation and water use by lower income households.

Table 3.3 – Demands for Potable and Raw Water - Projected (DWR Table 4-2)

Use Type	Additional Description (as needed)	Projected Water Use (AFY)				
		2020	2025	2030	2035	2040-opt
Single Family	--	1,878	1,881	1,871	1,870	1,874
Multi-Family	--	533	529	522	519	518
Commercial	--	202	203	205	206	207
Landscape	--	54	54	56	56	57
Institutional/Governmental	--	103	104	106	107	109
Losses	--	352	354	352	351	352
TOTAL		3,121	3,125	3,111	3,110	3,117
NOTES: Demand projections include passive conservation assumptions discussed in Section 3.2.3, including water conservation that would incur as a result of compliance with existing plumbing codes (i.e., Federal Energy Policy Act of 1992, CALGreen Building Code, AB 715, SB 407). Totals may not add exactly due to rounding.						

Table 3.4 – Inclusion in Water Use Projections (DWR Table 4-5)

Are Future Water Savings Included in Projections? (Refer to Appendix K of UWMP Guidebook)	Yes
If "Yes" to above, state the section or page number, in the cell to the right, where citations of the codes, ordinances, etc... utilized in demand projections are found.	Appendix C
Are Lower Income Residential Demands Included In Projections?	Yes

3.2.2 Water Use for Lower Income Households

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.

As indicated in Table 3.4, water use projections presented in Section 3.2.1 and Table 3.3 include projected water use by lower income households. A lower income household is defined under California Health and Safety Code §50079.5(a) to be 80 percent of median income, adjusted for family size. Based on US Census data for the District's service area, two distinct census

designated places (Temelec and Glen Ellen) are considered to meet the lower income households definition; the 80 percent median income figure is approximately \$50,000 and lower income households are estimated to comprise approximately 33 percent of the total households. Table 3.5 shows the projected water demands for lower income households based on 33 percent of the total single-family and multi-family residential projected water uses included in Table 3.3.

Table 3.5 – Projected Water Use for Lower Income Households

Lower-Income Water Demand Sector	Projected Potable Water Demand (AFY)				
	2020	2025	2030	2035	2040
Single Family Residential	620	621	617	617	618
Multi-Family Residential	176	175	172	171	171
Total	796	795	790	788	789

3.2.3 Water Savings from Codes, Standards, Ordinances, or Transportation and Land Use Plans

10631. (4) (A) If available and applicable to an urban water supplier, water use projections may display and account for the water savings estimated to result from adopted codes, standards, ordinances, or transportation and land use plans identified by the urban water supplier, as applicable to the service area.

“Passive conservation” refers to water savings resulting from actions and activities that do not depend on direct financial assistance or educational programs from the District. These savings result primarily from (1) the natural replacement of existing plumbing fixtures with water-efficient models required under current plumbing code standards, and (2) the installation of water-efficient fixtures and equipment in new buildings and retrofits as required under CALGreen Building Code Standards. The water use projections discussed in Section 3.2.1 and summarized in Table 3.3 included water savings associated with these codes and standards. Specifically, the projected water savings due to passive conservation are estimated to be up to 218 AFY by 2040, see Table 3.6.

Table 3.6 – Projected Water Savings due to Passive Conservation

	Water Savings (AFY)				
	2020	2025	2030	2035	2040
Total Water Savings due to Passive Conservation	31	73	133	180	218

3.2.4 Projected Non-Potable Water Demand

The District does not supply non-potable water, but is currently investigating recycled water options, as discussed further in Section 5.3. No non-potable water demand projections are available at this point in time.



3.2.5 Water Use Sectors Not Included in the Demand Projections

Several water use sectors listed in CWC §10631(e)(1) are not included in the water demand projections described in Sections 3.2.1 and 3.2.4 because they are not applicable to the District. The following sectors were not included in the demand projections in this Plan:

- Industrial (CWC §10631(e)(1)(D)) – The District does not currently, nor does it plan to, provide water for industrial uses.
- Sales to Other Agencies (CWC §10631(e)(1)(G)) – The District does not sell water to other agencies. The District does have an emergency supply agreement with the Sonoma Developmental Center to provide and/or receive water during times of emergency. However, this water would be a loan and would be repaid with water from the receiver, resulting a net-zero change in system water demands.
- Saline Water Intrusion Barriers, Groundwater Recharge, or Conjunctive Use (CWC §10631(e)(1)(H)) – The District does not currently use, nor does it plan to use, water for saline water intrusion barriers, groundwater recharge, or conjunctive use.
- Agricultural (CWC §10631(e)(1)(I)) – The District does not currently, nor does it plan to, provide water for agricultural uses.

3.2.6 Projected Total Water Demand

The District's total projected water demands, including both potable and recycled water demands, are summarized in Table 3.7.

Table 3.7 – Current and Projected Total Water Demands (DWR Table 4-3)

	Current and Projected Water Demands (AFY)					
	2015	2020	2025	2030	2035	2040 (opt)
Potable and Raw Water	2,528	3,122	3,125	3,112	3,109	3,117
Recycled Water Demand	0	0	0	0	0	0
Total Water Demand	2,528	3,121	3,125	3,111	3,110	3,117
NOTES: Demand projections include passive conservation assumptions discussed in Section 3.2.3, including water conservation that would incur as a result of compliance with existing plumbing codes (i.e., Federal Energy Policy Act of 1992, CALGreen Building Code, AB 715, SB 407).						

4. BASELINE WATER USE AND WATER CONSERVATION TARGETS

With the passage of SBx7-7, also known as the Water Conservation Act of 2009, each urban water supplier was required to develop a baseline daily per capita water use (“baseline water use”) in their 2010 UWMP and establish a per capita water use target for 2020 and an interim water use target for 2015. The baseline water use and targets are allowed to be updated in the 2015 UWMP. In support of implementing the requirements of SBx7-7, DWR produced a set of methodologies for developing baseline and compliance water use and targets, which are included in *Methodologies for Calculating Baseline and Compliance Urban Per Capita Water, California Department of Water Resources Division of Statewide Integrated Water Management Water Use and Efficiency Branch*, (“Methodologies”; DWR, 2016b).

As part of the compliance reporting for SBx7-7, water suppliers are required to complete and submit a set of standardized verification tables that were developed by DWR in their 2015 UWMPs. The information in these tables is discussed and summarized in the following subsections, and the complete set of SBx7-7 standardized tables, for both individual and regional reporting, is included in Appendix E.

4.1 SERVICE AREA POPULATION

10608.20 (e) An urban retail water supplier shall include in its urban water management plan due in 2010 pursuant to Part 2.6 (commencing with Section 10610) 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 bases for determining those estimates, including references to supporting data.

10608.20 (g) An urban retail water supplier may update its 2020 urban water use target in its 2015 urban water management plan required pursuant to Part 2.6 (commencing with Section 10610).

Methodology 2 Service Area Population. DWR will examine discrepancy between the actual population estimate and DOF’s projections for 2010; if significant discrepancies are discovered, DWR may require some or all suppliers to update their baseline population estimates.

In its 2010 UWMP, the District calculated the baseline population using the persons-per-connection method described in the Methodologies. The District’s service area closely matched several Census Designated Places (“CDPs”). However, since the District’s boundaries did not correspond by 95 percent or more with CDPs, the service area was further analyzed at the Census Block level. For each year in which a US Census was conducted (i.e., 1990 and 2000), a population estimate was obtained by compiling population estimates for each Census Block contained in the District’s service area. This population estimate was then compared to the total number of service connections in that year to determine the number of persons per connection. For all non-Census years, the persons-per-connection factor for the most recent Census year was multiplied by the number of service connections in that year in order to estimate the service area population.

Per CWC §10680.20 and the Methodologies, DWR is requiring that water suppliers recalculate their baseline population for the 2015 UWMPs if a water supplier did not use 2010 Census data for its baseline population calculations in the 2010 UWMP. Since 2010 Census data was not

available until 2012 and the District submitted its 2010 UWMP in June 2011, the District did not use 2010 Census data and must therefore recalculate its baseline population. To do so, the District established a 2010 persons per connection factor using 2010 Census data for Census Tracts and Blocks within the District's service area. As discussed in Section 2.4 the District's persons per connection factor is 3.455.

For the non-Census years between 2000 and 2010, the persons per connection value was interpolated linearly between values for the Census years. As a result, the District's 5- and 10-year baseline populations, presented in Table 4.11, have been slightly modified from the baseline populations included in its 2010 UWMP.

Table 4.1 – SBx7-7 Service Area Population (DWR SBx7-7 Table 3)

Year		Population
<i>10 to 15 Year Baseline Population</i>		
Year 1	1995	20,337
Year 2	1996	20,625
Year 3	1997	20,887
Year 4	1998	21,179
Year 5	1999	21,432
Year 6	2000	21,658
Year 7	2001	21,853
Year 8	2002	22,006
Year 9	2003	22,237
Year 10	2004	22,422
<i>5 Year Baseline Population</i>		
Year 1	2003	22,237
Year 2	2004	22,422
Year 3	2005	22,913
Year 4	2006	23,127
Year 5	2007	23,239
<i>2015 Compliance Year Population</i>		
	2015	23,782

Using the method described above and the persons-per-connection value obtained from the 2010 Census data, the District's 2015 population is estimated to be 23,782.

4.2 BASELINE WATER USE

The baseline water use is the water supplier's average gross daily water use per capita measured in gallons. This baseline includes all water entering the delivery system, including water losses. A water supplier may deduct from its gross water use water conveyed to other urban water suppliers, water placed into long-term storage, recycled water delivered within the supplier's service area, water delivered for agricultural use, water conveyed to other urban water suppliers, and water used for industrial processes.



Water suppliers must define a 10- or 15-year base (or baseline) period for water use that is then used to develop their future target per capita water use. Water suppliers must also calculate water use over a 5-year baseline period and use that value to determine a minimum required reduction in water use by 2020. Utilizing a 15-year baseline period is only allowed for water suppliers that meet at least 10 percent of their 2008 measured retail water demand through recycled water; the District does not meet this criterion and thus selected a 10-year baseline.

For the development of the District's baseline water use, a 10-year average was used from 1995 to 2004. The 10-year baseline water use calculated in the District's 2010 UWMP was 147 gallons per capita per day ("GPCD"). After correcting the baseline population, discussed in Section 4.1, the District's 10-year base daily per capita water use decreased to 142 GPCD. No deductions were made to the District's gross water use in either calculation.

A second requirement for completing the 2010 UWMP was that the District had to determine its 5-year base daily per capita water use. If the 5-year base daily water use exceeds 100 GPCD, then the 2020 water use target established by the District must be less than or equal to 95 percent of this 5-year baseline. The 5-year baseline water use calculated in the District's 2010 UWMP was 138 GPCD. After correcting the baseline population, discussed in Section 4.1, the District's 5-year base daily per capita water use decreased to 134 GPCD.

4.3 WATER USE TARGETS

10608.20 (b) An urban retail water supplier shall adopt one of the following methods for determining its urban water use target pursuant to subdivision (a):

- (1) Eighty percent of the urban retail water supplier's baseline per capita daily water use.*
- (2) The per capita daily water use that is estimated using the sum of the following performance standards: (A) For indoor residential water use, 55 gallons per capita daily water use as a provisional standard. Upon completion of the department's 2016 report to the Legislature pursuant to Section 10608.42, this standard may be adjusted by the Legislature by statute. (B) For landscape irrigated through dedicated or residential meters or connections, water efficiency equivalent to the standards of the Model Water Efficient Landscape Ordinance set forth in Chapter 2.7 (commencing with Section 490) of Division 2 of Title 23 of the California Code of Regulations, as in effect the later of the year of the landscape's installation or 1992. An urban retail water supplier using the approach specified in this subparagraph shall use satellite imagery, site visits, or other best available technology to develop an accurate estimate of landscaped areas. (C) For commercial, industrial, and institutional uses, a 10-percent reduction in water use from the baseline commercial, industrial, and institutional water use by 2020.*
- (3) Ninety-five percent of the applicable state hydrologic region target, as set forth in the state's draft 20x2020 Water Conservation Plan (dated April 30, 2009). If the service area of an urban water supplier includes more than one hydrologic region, the supplier shall apportion its service area to each region based on population or area.*
- (4) A method that shall be identified and developed by the department, through a public process, and reported to the Legislature no later than December 31, 2010. The method developed by the department shall identify per capita targets that cumulatively result in a statewide 20-percent reduction in urban daily per capita water use by December 31, 2020. In developing urban daily per capita water use targets, the department shall do all of the following: (A) Consider climatic differences within the state. (B) Consider population density differences within the state. (C) Provide flexibility to communities and regions in meeting the targets. (D) Consider different levels of per capita water use according to plant water needs in different regions. (E) Consider different levels of commercial, industrial, and institutional water use in different regions of the state. (F) Avoid placing an undue hardship on communities that have implemented conservation measures or taken actions to keep per capita water use low.*

10608.22. Notwithstanding the method adopted by an urban retail water supplier pursuant to Section 10608.20, an urban retail water supplier's per capita daily water use reduction shall be no less than 5 percent of base daily per capita water use as defined in paragraph (3) of subdivision (b) of Section 10608.12. This section does not apply to an urban retail water supplier with a base daily per capita water use at or below 100 gallons per capita per day.

Water use targets were calculated in the District's 2010 UWMP and are updated below based on the revised population and baseline water use estimates.

4.3.1 Individual Water Use Targets

Under SBx7-7, each individual urban water supplier must establish a 2020 water use target ("2020 Target") using one of the following four methods established by DWR:

- Method 1: 80 percent of Base Daily Per Capita Use;
- Method 2: Performance standards based on actual water use data for indoor residential water use, landscaped area, and commercial, industrial, and institutional (“CII”) water use;
- Method 3: 95 percent of the San Francisco Bay hydrologic region; and
- Method 4: Savings by water sector (indoor residential and CII) and landscape and water loss savings.

The District elected to use Method 3 for the development of its individual water use target, which resulted in a 2020 Target of 124 GPCD. The District’s 2015 “Interim Target” is then 133 GPCD, which represents the midpoint between the District’s revised 10-year base daily per capita water use (142 GPCD) and the 2020 Target (124 GPCD).

Under CWC §10608.22, water suppliers must confirm that the 2020 Target will reduce 2020 water use by a minimum of five percent from the 5-year base daily per capita water use. As discussed in Section 4.2, the District’s 5-year baseline water use is 134 GPCD. The 2020 Target (124 GPCD) is less than 95 percent of the 5-year baseline water use (134 GPCD), so the selected 2020 Target is in compliance with the UWMP Act.

The District’s baseline periods, baseline water use, and water use targets are summarized in Table 4.22.

Table 4.2 – Individual SBx7-7 Baselines and Targets Summary (DWR Table 5-1)

Baseline Period	Start Year	End Year	Average Baseline (GPCD)	2015 Interim Target (GPCD)	Confirmed 2020 Target (GPCD)
10-15 year	1995	2005	142	133	124
5 Year	2003	2007	134	--	--

4.3.2 Regional Water Use Targets

Instead of, or in addition to, individual water use targets, urban water retail suppliers may plan, comply, and report on SBx7-7 requirements on a regional basis as part of a “Regional Alliance.” As described in Section 1.3, the District is one of eight Water Contractors to the SCWA for purchase of Russian River water supply. As such, the Water Contractors are eligible to form a Regional Alliance under the provisions of SBx7-7 because they are recipients of water from a common wholesale water supplier. A water conservation regional partnership among the eight Water Contractors is already in existence in the form of the SMSWP. This regional group, which collaborates on regional water conservation efforts, formed a Regional Alliance for the purposes of meeting regional water use targets. The members of the Regional Alliance include: the District, City of Sonoma, City of Santa Rosa, Town of Windsor, City of Rohnert Park, City of Cotati, City of Petaluma, Marin Municipal Water District, and North Marin Water District. The District Board approved becoming a member of the Regional Alliance and using regional targets at its Board meeting on 1 March 2011. A copy of the letter approving the District’s membership in the regional alliance is included in Appendix F.

The DWR established three options for calculating a Regional Alliance water use target. The District, along with the other Water Contractors in the Regional Alliance, selected Option 1, which preserves maximum flexibility at the supplier level. Under Option 1, each member of the Regional Alliance calculates their individual targets and then weighs the individual targets by each member's population. The weighted targets are then averaged to determine the Regional Alliance Target. Detailed calculations conducted by the Regional Alliance are included in Appendix F. In the District's 2010 UWMP, the Regional Alliance's 2015 Interim Target was 142 GPCD and its 2020 Target was 129 GPCD. Due to corrections in the Water Contractors' water use targets, such as the District's revisions discussed in Section 4.3, the Regional Alliance water use targets have changed slightly. As summarized in Table 4.3, the Regional Alliance's revised 2015 Interim Target is 143 GPCD and its revised 2020 Target is 129 GPCD.

Table 4.3 – Regional SBx7-7 Baselines and Targets Summary (DWR Table 5-1)

Baseline Period	Start Year	End Year	Average Baseline (GPCD)	2015 Interim Target (GPCD)	Confirmed 2020 Target (GPCD)
10-15 year	--	--	156	143	129
5 Year	--	--	--	--	--

4.4 2015 TARGET COMPLIANCE

10608.24 (a) Each urban retail water supplier shall meet its interim urban water use target by December 31, 2015.

10608.24 (d) (1) When determining compliance daily per capita water use, an urban retail water supplier may consider the following factors:

- (A) Differences in evapotranspiration and rainfall in the baseline period compared to the compliance reporting period.*
- (B) Substantial changes to commercial or industrial water use resulting from increased business output and economic development that have occurred during the reporting period.*
- (C) Substantial changes to institutional water use resulting from fire suppression services or other extraordinary events, or from new or expanded operations, that have occurred during the reporting period.*

(2) If the urban retail water supplier elects to adjust its estimate of compliance daily per capita water use due to one or more of the factors described in paragraph (1), it shall provide the basis for, and data supporting, the adjustment in the report required by Section 10608.40.

10608.40. Urban water retail suppliers shall report to the department on their progress in meeting their urban water use targets as part of their urban water management plans submitted pursuant to Section 10631. The data shall be reported using a standardized form developed pursuant to Section 10608.52.

The CWC §10608.24(a) requires that water suppliers calculate their actual water use in 2015 to determine whether or not they have met their 2015 Interim Target and to assess their progress towards meeting their 2020 Target.

**VALLEY OF THE MOON WATER DISTRICT
2015 URBAN WATER MANAGEMENT PLAN**



As summarized in Tables 2.2 and 3.1, the District's 2015 population was 23,782 and its 2015 water use was 2,527 acre-feet, which results in a daily gross per capita water use estimate of 95 GPCD.

The District is not seeking adjustments to its 2015 Interim Target of 133 GPCD and, as summarized in Table 4.44, is in full compliance with its 2015 Interim Target GPCD.

Table 4.4 – Individual 2015 SBx7-7 Compliance (DWR Table 5-2)

Actual 2015 GPCD	2015 Interim Target GPCD	Optional Adjustments to 2015 GPCD Enter "0" for adjustments not used <i>From Methodology 8</i>				2015 GPCD (Adjusted if applicable)	Did Supplier Achieve Targeted Reduction for 2015? (y/n)
		Extraordinary Events	Economic Adjustment	Weather Normalization	TOTAL Adjustments		
95	133	0	0	0	0	95	Yes
<i>*All values are in Gallons per Capita per Day (GPCD)</i>							

As discussed in Section 2.4 and summarized in Table 2.3, the District's projected population in 2020 is 24,174. As discussed in Section 3.2.1 and summarized in Table 3.3, the District's projected water demand in 2020 is 2,770 AFY. Therefore, the District's gross per capita water use in 2020 is projected to be 102 GPCD, which is well below its 2020 Target of 124 GPCD.

The Regional Alliance's 2015 water use was 66,705 AF and the 2015 population was 596,324, which results in a gross daily per capita water use estimate of 100 GPCD. The Regional Alliance is not seeking adjustments to its 2015 Interim Target and, as summarized in Table 4.5, is in full compliance with its 2015 Interim Target GPCD.

Table 4.5 – Regional 2015 SBx7-7 Compliance (DWR Table 5-2)

Actual 2015 GPCD	2015 Interim Target GPCD	Optional Adjustments to 2015 GPCD Enter "0" for adjustments not used <i>From Methodology 8</i>		2015 GPCD (Adjusted if applicable)	Did Supplier Achieve Targeted Reduction for 2015? (y/n)
		Economic Adjustment	TOTAL Adjustments		
100	143	0	0	100	Yes
<i>*All values are in Gallons per Capita per Day (GPCD)</i>					

Collectively by 2020, the Regional Alliance members are projecting a total population of 626,987 and an annual water demand of 82,014 AFY. Therefore, the Regional Alliance's projected gross per capita water use in 2020 is 117 GPCD, which is less than the 2020 Target of 129 GPCD.



4.5 WATER USE REDUCTION PLAN

The District's actual per capita water demand in 2015 was substantially lower than its 2015 Interim Target. As discussed in more detail below, the reduction in per capita water use between 2010 and 2015 is due to both water use cutbacks in response to the recent drought and water conservation efforts supported by the District over the past five years (see also Section 8.2).

In response to the historic drought of 2012 through 2015, the State Water Resources Control Board ("SWRCB") implemented a series of state-wide prohibitions covering certain water uses. These mandated water use restrictions, and people's general willingness to conserve water during a drought, have resulted in a significant decline in residential water use throughout the state and in the District specifically. On 1 April 2015, the Governor of California issued Executive Order ("EO") 5-29-15 directing the SWRCB to impose restrictions to achieve a state-wide 25% reduction in potable water use. In order to implement the requirements of EO 5-29-15, the SWRCB adopted Resolution 2015-0032 on 5 May 2015 to mandate further minimum actions by water suppliers and their customers to reduce potable water use into 2016. This resolution assigned a mandatory water conservation savings goal to each water supplier that established a required percentage reduction in residential per capita water use. The District was assigned a mandatory water conservation standard of 20 percent by the SWRCB. Through March 2016, the District has met its SWRCB-mandated reduction target and has achieved a 28.2 percent reduction in water demand relative to water demand in 2013.

The degree to which the observed reduction in water demand is a temporary condition in response to the drought, and not a permanent reduction resulting from passive and active conservation is difficult to quantify. However, given the magnitude of the total savings in recent years (i.e., 28.2 percent since 2013), the drought appears to have had a significant effect. As such, the District has conservatively assumed that per capita water use will rebound as the drought subsides and water use restrictions are eased, although water use is unlikely to fully recover to pre-drought levels.

The District has long been a strong proponent of water conservation and plans to continue to actively manage its per capita water use through implementation of demand management measures ("DMMs"). In addition to its local programs, as part of the Regional Alliance, the District participates in the SMSWP water conservation programs which provide a cost benefit through "economies of scale" and other benefits. The District's long-term water conservation program (i.e., water use reduction plan) and its current and projected water savings are detailed in the Maddaus Demand Analysis included in Appendix C.

5. WATER SYSTEM SUPPLIES

*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 described in subdivision (a).*

The District primarily relies upon surface water purchased from the SCWA to meet customer demands. Local groundwater production from wells owned and leased by the District comprises the remaining portion of the District's water supply portfolio. The following sections describe the District's historical, current, and future water supplies.

5.1 SCWA WHOLESALE WATER

Under normal water year conditions, approximately 85 percent of the District's water supply is surface water purchased from the SCWA. More detailed information regarding SCWA's water supply and facilities can be found in SCWA's UWMP at the following link: www.scwa.ca.gov/uwmp/. A general description of the SCWA water supply and transmission system follows.

5.1.1 SCWA Water Rights

The SCWA is currently authorized by the SWRCB to store up to 245,000 AFY of water in Lake Sonoma and up to 122,500 AFY of water in Lake Mendocino. Per a series of four permits issued by the SWRCB, the SCWA may divert and redivert 180 cubic feet per second ("cfs") of water, up to a maximum of 75,000 AFY, from the Russian River at the SCWA's Wohler and Mirabel facilities and other points of diversion. The permits also establish minimum instream flow requirements for fish and wildlife protection and recreation. The SCWA has a pending application with the SWRCB to increase SCWA's Russian River diversion limit from 75,000 AFY to 101,000 AFY.

5.1.2 SCWA Water Supply Agreement

The District is one of eight Water Contractors that hold water supply contracts with the SCWA, collectively known as the *Restructured Agreement for Water Supply* ("Restructured Agreement"). The Water Contractors included in the Restructured Agreement include the following cities and water districts:

- City of Santa Rosa;
- Town of Windsor;
- City of Rohnert Park;
- City of Cotati;
- City of Petaluma;
- City of Sonoma;

- Valley of the Moon Water District; and
- North Marin Water District.

Additionally, the SCWA provides Russian River water to the Marin Municipal Water District (“MMWD”) and other customers as set forth in separate water supply agreements.⁴

The Restructured Agreement was executed in 2006 and generally provides for the financing, construction, and operation of existing and new diversion facilities, transmission lines, storage tanks, booster pumps, conventional wells, and appurtenant facilities. The Restructured Agreement provides the contractual relationship between the SCWA and its eight Water Contractors, including the District, and includes specific maximum amounts of water that the SCWA is obligated to supply to its Water Contractors. The maximum water allocations for each of SCWA’s Water Contractors set forth within the Restructured Agreement were premised on SCWA’s diversion and rediversion water rights being increased to 101,000 AFY and on the construction of the new facilities authorized by the Restructured Agreement. The term of the Restructured Agreement is through 2037 and can be extended by amendment.

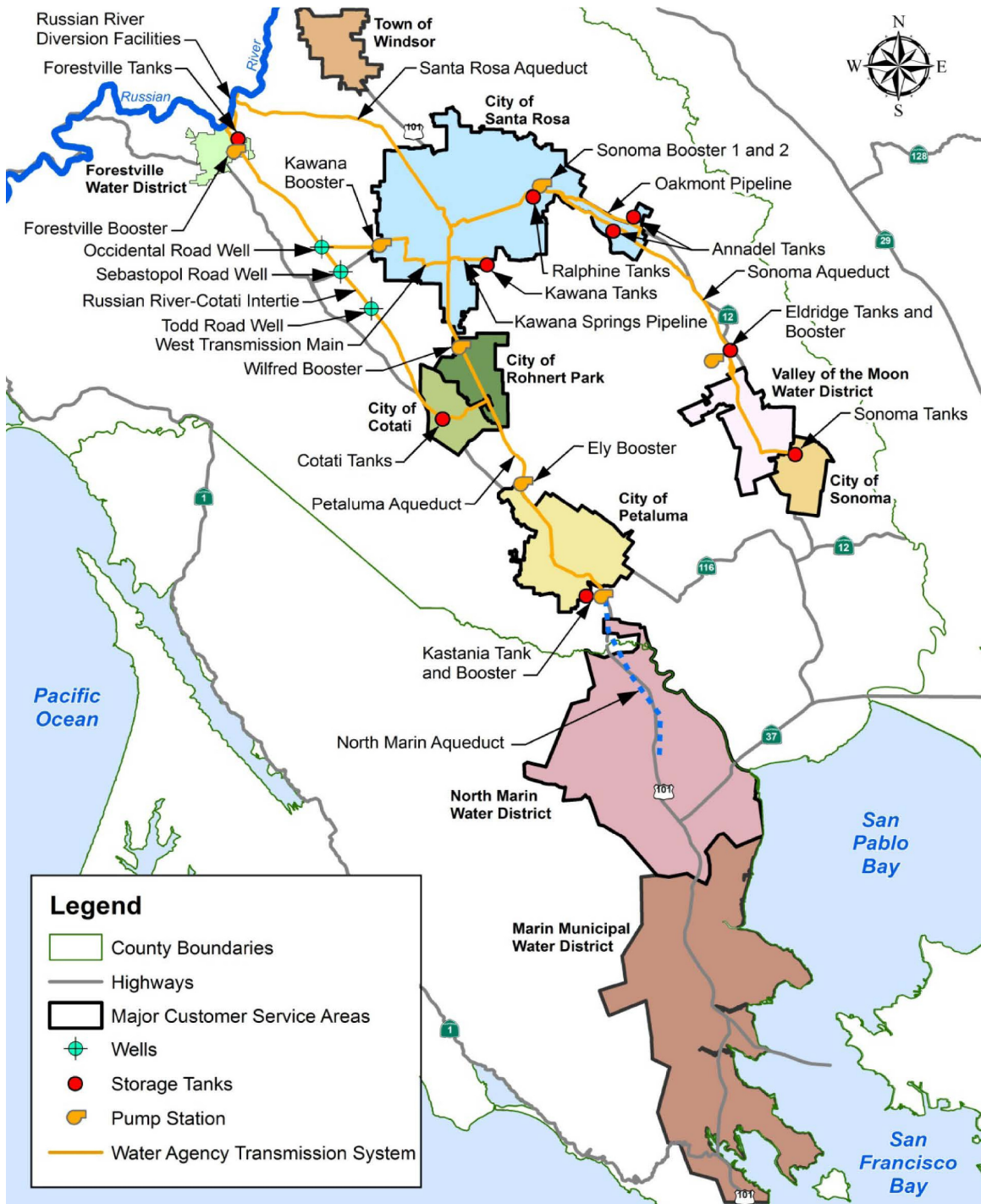
5.1.3 District Entitlement

Under the Restructured Agreement, the District is entitled to 8.5 million gallons per day (“MGD”) during any month and an annual maximum of 3,200 AFY. Provided the supply is available, the Restructured Agreement permits the District to take delivery of water in excess of its entitlement during a given month, provided specific conditions specified in the Agreement are met.

5.1.4 SCWA Transmission System

The SCWA’s storage and transmission system is shown on Figure 5.1. As described below, the storage and transmission system includes lakes, streams, rivers, aqueducts, tanks and other facilities.

⁴ Other SCWA customers include County of Sonoma, California-American Water Company, Forestville Water District, Lawndale Mutual Water Company, Kenwood Village Water Company, Penngrove Water Company, the City of Sebastopol, the State of California, and Santa Rosa Junior College.



Abbreviations

SCWA = Sonoma County Water Agency
UWMP = Urban Water Management Plan

Notes

1. All locations are approximate.
2. Not to scale.

Sources

Sonoma County Water Agency 2010 UWMP.

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Kalinowski, Inc.**

**SCWA Service Area and Water
Transmission System Facilities**

Valley of the Moon Water District
2015 Urban Water Management Plan
Sonoma County, CA
May 2016

EKI B50100.00

Figure 5.1

DRAFT



The SCWA storage and transmission system is supplied water from the natural flow of the Russian River. The Russian River water is stored in Lake Sonoma, behind Warm Springs Dam, and in Lake Mendocino, behind Coyote Dam. These dams are federal projects under the jurisdiction of the U.S. Army Corps of Engineers (“USACE”). The SCWA is the local sponsor and partners with the USACE for the water supply portion of the reservoir projects. The SCWA owns and operates the water supply pools at both Lake Sonoma and Lake Mendocino. The design water supply pool capacities of Lake Sonoma and Lake Mendocino are 245,000 AFY and 122,500 AFY, respectively.

The SCWA uses approximately 14 miles of the natural channel of Dry Creek and approximately eight miles of the Russian River to convey water from Lake Sonoma to its diversion facilities. Water is diverted and extracted from the stretch of river located just upstream of Wohler Bridge and downstream of Mirabel via six Ranney Collectors. The diverted river water percolates through sand and gravel and only needs the addition of chlorine to meet the California Drinking Water Program drinking water quality standards. A system of aqueducts, booster pumps, and tanks then distribute the water to the various Water Contractors and other transmission system users, including the MMWD. The transmission system was designed to meet peak day demands of its customers.

The SCWA also owns and operates three groundwater supply wells located in the Santa Rosa Plain Subbasin of the Santa Rosa Valley Groundwater Basin. These groundwater wells are located along the Russian River-Cotati Intertie Pipeline and are used to supplement the SCWA water supply. Groundwater that is added into the SCWA transmission system from these wells is able to be conveyed to the City of Cotati, City of Rohnert Park, City of Petaluma, North Marin Water District, and MMWD. The SCWA water supply delivered to the District does not include supplemental groundwater. Information and sufficiency analysis of the SCWA groundwater wells can be found in the SCWA’s UWMP.⁵

As discussed in Section 2.5, the District’s water supply is conveyed through ten turnouts from the Sonoma Aqueduct, which is owned and operated by the SCWA. The District and the City of Sonoma are served by the existing Sonoma Aqueduct facilities. Pressure for the aqueduct in this region is provided by Sonoma Booster Pump Station No. 1 and Sonoma Booster Pump Station No. 2, located on the east side of Spring Lake. The Eldridge Booster Pump Station, located near the northern boundary of the District near Glen Ellen, is typically off-line. Storage in this portion of the Sonoma Aqueduct is provided by two above-ground water storage tanks located near Oakmont (Annadel No. 1 and Annadel No. 2) and a third tank near Glen Ellen (Eldridge Tank).

5.2 GROUNDWATER

The District’s water supply comes predominantly from purchased surface water from the SCWA (see Section 5.1). The remainder of the District’s water supply, amounting to approximately 15 percent in the average year, is provided by local groundwater supply wells.

⁵ The SCWA’s 2015 UWMP is accessible at: www.scwa.ca.gov/uwmp/.



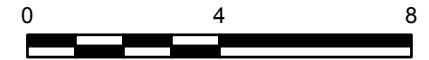
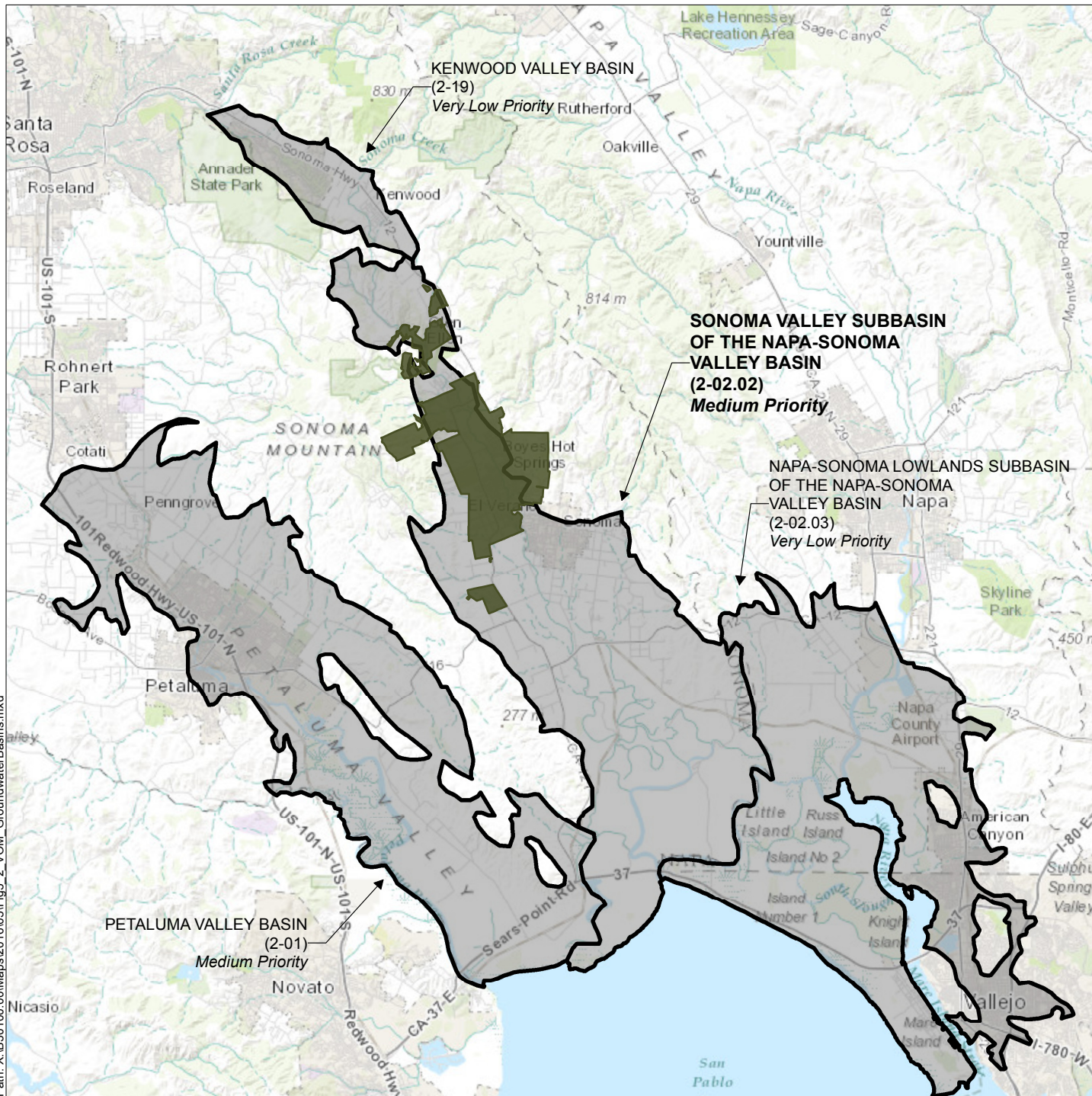
This section provides a description of the hydrogeology of the local groundwater basin, groundwater management within the basin, groundwater quality, and the sufficiency of the groundwater for projected groundwater pumping. A description of the groundwater production wells owned or leased by the District is provided in Section 2.5. A description of the Santa Rosa Plain Subbasin, which supplements the wholesale water supply provided by SCWA, is described in SCWA's 2015 UWMP and is not provided separately in the District's UWMP.⁶

5.2.1 Groundwater Basin Description

*10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:
10631 (b) 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: (2) A description of any groundwater basin or basins from which the urban water supplier pumps groundwater. For those basins for which a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree. For basins that have not been adjudicated, information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition.*

As shown in Figure 5.2, the District is located within the Sonoma Valley Groundwater Subbasin ("Basin"), which is identified by DWR as 2-02.02 and is a subbasin of the Napa-Sonoma Valley Groundwater Basin (DWR 2-02). The Basin is not adjudicated and has not been identified by DWR as a critically-overdrafted groundwater basin. The Basin is listed as a medium priority and its management will move from voluntary to mandatory under the Sustainable Groundwater Management Act of 2014 requirements.

⁶ The SCWA's 2015 UWMP is accessible at: www.scwa.ca.gov/uwmp/.



(Approximate Scale in Miles)

Legend

-  DWR Bulletin 118 Groundwater Basins
-  VOMWD Service Area

Abbreviations

- CASGEM = California Statewide Groundwater Elevation Monitoring Program
- DWR = Department of Water Resources

Notes

1. All locations are approximate.
2. Priority rankings from CASGEM groundwater basin prioritization, June 2014.

Sources

World Topographic base map provided by ArcGIS Online (ESRI, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBease, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, OpenStreetMap contributors, and the GIS User Community), obtained 6 May 2016.

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Groundwater Basins in the Vicinity of the District Service Area

Valley of the Moon Water District
2015 Urban Water Management Plan
Sonoma County, CA
May 2016

DRAFT EKI B50100.00
Figure 5.2

Except where otherwise noted, information in the following section has been obtained from the following two sources:

- Farrar et al., 2006. Farrar, C.D., Metzger, L.F., Nishikawa, Tracy, Koczot, K.M., and E.G. Reichard, *Geohydrologic characterization, water-chemistry, and ground-water flow simulation model of the Sonoma Valley area*, Sonoma County, California, U.S. Geological Survey Scientific Investigations Report 2006-5092, 167 p., 2006.
- Luhdorff & Scalmanini, 1999. Luhdorff and Scalmanini, *Master Plan for Ground-Water Development and Management*, prepared for Valley of the Moon Water District, 1999.

The Sonoma Valley is located within the North Coast Range's geomorphic province of California. The Sonoma Mountains flank the west side of the Basin with the Mayacmas Mountains bounding the Basin to the east. The Valley between the two is dominated by Sonoma Creek. The Valley is not uniform in width or slope and can be divided into three parts, based on topography. The District is located in the middle part of the Valley, which is much narrower than the upper and lower parts.

Water-bearing deposits underlying the District include younger and older Quaternary alluvium deposits, the Huichica and Glen Ellen Formations, and the Sonoma Volcanics. The thickness and extent (if any) of the Miocene to Pliocene Petaluma Formation beneath the District is unknown, and the Mesozoic Franciscan Complex bedrock is not exposed or encountered in wells⁷.

The younger Quaternary alluvium consists of stream channel, flood plain, alluvial fan, and salt marsh deposits of late Pleistocene to recent age. The younger alluvium has a large percentage of loose sand and gravel yielding water easily to wells; however, it is only a thin veneer and most wells penetrate the full thickness.

The older Quaternary alluvium is composed of lenticular deposits of poorly sorted clay, silt, sand, and gravel, and is late Pleistocene in age. The older alluvium underlies the younger alluvium and is separated by an erosional unconformity (Kunkel and Upson, 1960). Wells that encounter sands and gravels in the older alluvium can yield as much as 500 to 1,000 gpm. According to the U.S. Geological Survey ("USGS"), the Quaternary alluvium may extend to depths of up to 300 feet below ground surface in the center of the valley.

Underlying the Quaternary alluvium is the Glen Ellen Formation of late-Pliocene to early-Pleistocene age. The Glen Ellen Formation was deposited by alluvial fans and is composed of poorly sorted lenticular beds of clay, silt, sand, and gravel, with much of the material being derived from the Sonoma Volcanics. The Glen Ellen Formation interfingers with the Sonoma Volcanics and the underlying Huichica Formation, and is up to 900 feet thick. Permeability is generally relatively low, but water obtained from the lenses of gravel can locally be sufficient for municipal use.

⁷ <http://pubs.usgs.gov/sir/2006/5092/pdf/sir2006-5092.pdf>



The Huichica Formation is interbedded with and partly older than the Glen Ellen Formation. The Huichica is early Pleistocene to Pliocene in age and was deposited as alluvial fans by streams that drained uplifted areas of the Sonoma Volcanics. The formation also contains a thick body of clay and silt representing possible lake or swamp deposition. There are lenses of boulders or gravel with fine material within the fine grained deposits. The Huichica's thickness exceeds 1,000 feet in parts of the valley. This is not considered to be a highly productive formation and is mostly developed for domestic use.

The Miocene to Pliocene Sonoma Volcanics consist of a variable sequence of volcanoclastic tuffs, lahars, debris and mudflows, and sedimentary units interbedded with volcanic flows of andesite, basalt, and rhyolite. The significant aquifers in the volcanics are the tuffs which include pumice beds (Kunkel and Upson, 1960). The Sonoma Volcanics are highly variable in terms of yield. The District has four wells completed in this formation that yield between 90 gpm and 250 gpm.

Recharge occurring in the Sonoma Volcanics is mainly from surface outcroppings in the mountains that border the Sonoma Valley. Alluvium is recharged from percolation through sediments in local creeks and surface runoff.

5.2.2 Groundwater Management

*10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:
10631. (b) If groundwater is identified as an existing or planned source of water available to the supplier, all of the following information shall be included in the plan: (1) A copy of any groundwater management plan adopted by the urban water supplier, including plans adopted pursuant to Part 2.75 (commencing with Section 10750), or any other specific authorization for groundwater management.*

Between 2006 and 2007, the District, the SCWA, the City of Sonoma, and a broad range of stakeholders who live in the Sonoma Valley completed a groundwater management planning process to help ensure the long-term sustainability of the region's groundwater resources. A groundwater management plan, consistent with Assembly Bill 3030 (and as subsequently modified by Senate Bill 1938) was prepared in December 2007. A copy of the Sonoma Valley Groundwater Management Plan ("SVGMP") can be found at the following link: <http://www.scwa.ca.gov/svgroundwater/>. The SVGMP provides a groundwater management framework for an area – herein referred to as the "Valley" – that encompasses the entire Basin, as well as portions of two other groundwater basins recognized by DWR: the Petaluma Valley Groundwater Basin (DWR 2-01) and the Kenwood Valley Groundwater Basin (DWR 2-19). Implementation of the SVGMP is conducted through the activities of the Sonoma Valley Groundwater Management Program.

The SVGMP indicates that in the year 2000, more than half the water demand in the valley was met with groundwater (57 percent), followed by imported water (36 percent), with the remaining demand met by recycled water (7 percent) and local surface water (not quantified). The largest use of groundwater was for irrigation (72 percent), with rural domestic use at 19 percent and municipal/urban demand at 9 percent (SCWA, 2007). The SVGMP also reports that the Valley has experienced significant growth and land-use changes over the last 30 years, especially with

regard to irrigated agriculture, such as vineyards. The SVGMP identifies areas of declining groundwater levels, potential water quality problems from sea water intrusion (south of the District's service area), upwelling of geothermal waters, and groundwater/surface-water interaction, all of which are being analyzed and updated annually as additional data become available and analyses are completed.

Groundwater modeling efforts were completed by the USGS in 2006 (Farrar et al., 2006) and were utilized by the SVGMP to evaluate the effects of increasing demands on the groundwater between 2001 and 2030, including effects during both normal and dry year weather scenarios. Based on the modeling effort, Valley-wide groundwater use was projected to increase from the 8,500 AFY in 2000 to an estimated 10,100 to 11,300 AFY in 2030. The increase in demand in Valley pumping was estimated to result in a reduction of 16,000 to 22,000 AF from aquifer storage, likely resulting in lower groundwater levels and potential adverse impacts such as salinity intrusion, land subsidence, etc. In response to these findings, the SVGMP program established Basin Management Objectives ("BMOs") that concentrate on:

- BMO-1 – Maintain groundwater elevations for the support of beneficial uses of groundwater and to protect against inelastic land subsidence.
- BMO-2 – Improve water use efficiency and conservation.
- BMO-3 – Identify and protect groundwater recharge areas and enhance the recharge of groundwater where appropriate.
- BMO-4 – Manage groundwater in conjunction with other water sources.
- BMO-5 – Protect groundwater quality for beneficial uses including minimizing saline intrusion.
- BMO-6 – Protect against adverse interactions between groundwater and surface water flows.
- BMO-7 – Improve the community's awareness of groundwater planning, water resources, and legal issues.
- BMO-8 – Improve the groundwater database and basin understanding through consistent monitoring and additional surveys, and improve basin analytical tools including the groundwater simulation model.
- BMO-9 – Manage groundwater with local control.
- BMO-10 – Explore, identify and maximize non-regulatory approaches to manage the groundwater resource.

Between 2008 and 2010, an Annual Report was prepared each year summarizing the accomplishments of the prior year. In 2011 and 2012, shorter Progress Reports were published reporting on the actions taken towards meeting BMOs, providing a hydrologic and groundwater conditions update, and presenting goal and planned activities for the following year. In March 2014, a Five Year Review and Update was published presenting a summary on the progress of the Sonoma Valley Groundwater Management Program.⁸ Since its initiation, 86 voluntary private wells have been added to Valley's groundwater level monitoring program, bringing the total number of wells participating in the program to 141.

⁸ The Five Year Review and Update is accessible at: <http://www.scwa.ca.gov/five-year-review/>.

The analysis of groundwater data has highlighted two groundwater depression zones in the Sonoma Valley that can be described as the Carriger Road Area and South 8th Street East Area. Management efforts in these areas to date have included informational meetings with impacted parties, community messaging, and voluntary conservation. It is expected that, as the groundwater management program moves from voluntary to mandatory, additional actions will be required to address these areas.

5.2.3 Sustainable Groundwater Management Act

The first comprehensive groundwater legislation in California history, the Sustainable Groundwater Management Act of 2014 (“SGMA”), was enacted on 16 September 2014 as part of a three-bill package including AB 1739 (Dickinson), SB 1169 (Pavley), and SB 1319 (Pavley). The legislation provides a framework for the sustainable management of groundwater by local agencies, with an emphasis on the preservation of local control. The state agencies primarily responsible for implementing SGMA are DWR and the SWRCB. The Napa-Sonoma Basin is listed as a Medium Priority basin and is therefore subject to the requirements of SGMA, including the formation of a Groundwater Sustainability Agency (“GSA”) by 30 June 2017 and the development of a Groundwater Sustainability Plan (“GSP”) by 30 June 2022.

Since the passage of SGMA, the District has been working with the other eligible GSA agencies in the Sonoma Valley to establish a Sonoma Valley GSA. It is anticipated that the GSA will be established in late 2016 or early 2017, in advance of the 30 June 2017 deadline. Once the formation of the GSA is completed, the District’s focus will shift to the development of the GSP.

5.2.4 Historical Groundwater Use

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

The volume of groundwater pumped by the District over the period 2011 through 2015 is presented in Table 5.1.

Table 5.1 – Groundwater Volume Pumped (DWR Table 6-1)

Groundwater Type	Location or Basin Name	Groundwater Production (AFY)				
		2011	2012	2013	2014	2015
Alluvial Basin	Sonoma Valley Subbasin of the Napa-Sonoma Valley Groundwater Basin (2-02.02)	550	449	452	495	581
TOTAL		550	449	452	495	581

5.2.5 Projected Future Groundwater Use

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

The District will continue to use its wells to supplement its purchased SCWA water, but plans to decrease the use of the wells over time as the District implements additional water conservation programs. Groundwater production will be expanded to meet demands in the case of a drought or a decrease in SCWA water supply. The District's projected groundwater production is presented in Table 5.2.

Table 5.2 –Projected Future Groundwater Production

Groundwater Type	Location or Basin Name	Groundwater Production (AFY)				
		2020	2025	2030	2035	2040
Alluvial Basin	Sonoma Valley Subbasin of the Napa-Sonoma Valley Groundwater Basin (2-02.02)	450	327	232	100	100
TOTAL		450	327	232	100	100

5.3 WASTEWATER AND RECYCLED WATER

The District does not use recycled water and has no plans for recycled water use within the planning horizon of the UWMP. In order to further supplement and enhance the District's water supply sources, the District has previously explored the option of acquiring recycled water from SVCSD. The District recognizes the benefit of expanded recycled water use to offset agricultural pumping in the southern portion of Sonoma Valley. However, extensive pipeline construction would be required to convey recycled water from the Sonoma Valley Water Treatment Plant, owned and operated by SVCSD, to the District's service area. As a result, implementation of a recycled water program in the District's service area is cost-prohibitive in the near-term. That being said, the District will continue to explore opportunities to utilize recycled water in the future in conjunction with others.

5.3.1 Coordination

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.

While the District has coordinated with SVCSD, SCWA, and the City of Sonoma in the past regarding the availability of recycled water supplies and the potential for a future recycled water program, no future recycled water use is projected in this Plan.

5.3.2 Wastewater Collection, Treatment, and Disposal

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.

The SVCSD provides wastewater collection, treatment, and disposal services within the District's service area and other areas in the Sonoma Valley, including the City of Sonoma. The SVCSD reclamation facility provides tertiary treatment for a permitted average daily dry weather flow capacity of 3 MGD and is capable of treating up to 16 MGD.

Treated wastewater is currently used to restore the Napa Salt Marsh, is discharged to the San Pablo Bay via Schell and Hudeman Slough, or is reused in the southern part of the Sonoma Valley. Current reuse of wastewater treated by SVCSD includes vineyard and pasture irrigation, water for construction, and a small amount of water used for residential landscape irrigation. In 2015, approximately 2,024 AF of treated water was reused, thus offsetting groundwater pumping by this amount. In recent years, the SVCSD has explored the feasibility of expanding recycled water use to offset local groundwater pumping or imported Russian River water in addition to reducing or eliminating discharges to San Pablo Bay.

Table 5.3 summarizes the volume of wastewater collected within the District's service area in 2015.

Table 5.3 – Wastewater Collected Within Service Area in 2015 (DWR Table 6-2)

Wastewater Collection			Recipient of Collected Wastewater			
Name of Wastewater Collection Agency	Wastewater Volume Metered or Estimated?	Volume of Wastewater Collected from UWMP Service Area 2015 (AF)	Name of Wastewater Treatment Agency Receiving Collected Wastewater	Treatment Plant Name	Is WWTP Located Within UWMP Area?	Is WWTP Operation Contracted to a Third Party?
Sonoma Valley County Sanitation District	Estimated	1,310	Sonoma Valley County Sanitation District	Sonoma Valley Wastewater Treatment Plant	No	Yes
Total Wastewater Collected from Service Area in 2015		1,310				

Wastewater is collected from the District's service area by SVCSD and treated and disposed of outside of the District's service area. Therefore, as indicated in Table 5.4, the District has not completed DWR Table 6-3.

**Table 5.4 – Wastewater Treatment and Discharge Within Service Area in 2015
(DWR Table 6-3)**

☒ No wastewater is treated or disposed of within the UWMP service area. The supplier will not complete the table below.										
Wastewater Treatment Plant Name	Discharge Location Name or Identifier	Discharge Location Description	Wastewater Discharge ID Number	Method of Disposal	Does This Plant Treat Wastewater Generated Outside the Service Area?	Treatment Level	2015 Volumes			
							Wastewater Treated	Discharged Treated Wastewater	Recycled Within Service Area	Recycled Outside of Service Area
--	--	--	--	--	--	--	--	--	--	--
Total							--	--	--	--

5.3.3 Current and Projected Uses of Recycled Water

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, indirect potable reuse, 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.

Extensive pipeline construction would be required to convey recycled water from the Sonoma Valley Water Treatment Plant to the District's service area. As a result, implementation of a recycled water program in the District's service area is cost-prohibitive in the near-term. The District will continue to explore opportunities to utilize recycled water in the future in conjunction with others.

As indicated in Table 5.5, there is no current or projected recycled water use within the District's service area.

Table 5.5 – Current and Projected Recycled Water Direct Beneficial Uses Within Service Area (DWR Table 6-4)

☒	Recycled water is not used and is not planned for use within the service area of the supplier. The supplier will not complete the table below.							
Beneficial Use Type	General Description of 2015 Uses	Level of Treatment	2015	2020	2025	2030	2035	2040
--	--	--	--	--	--	--	--	--
Total:			--	--	--	--	--	--

5.3.4 Comparison of Previously Projected Use and Actual Use

10633. (e) A description of the actual use of recycled water in comparison to uses previously projected pursuant to this subdivision.

In its 2010 UWMP, the District projected no recycled water use in 2015. There is currently no recycled water use within the District's service area. Therefore, as indicated in Table 5.6, the District has not completed DWR Table 6-5.

**Table 5.6 – 2010 UWMP Recycled Water Use Projection Compared to 2015 Actual
(DWR Table 6-5)**

☒	Recycled water was not used in 2010 nor projected for use in 2015. The supplier will not complete the table below.	
Use Type	2010 Projection for 2015 (AF)	2015 Actual Use (AF)
--	--	--
Total	--	--

5.3.5 Promoting Recycled Water Use

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.

Currently there are no financial or other incentives to the District's customers to encourage use of recycled water as recycled water is still not available within the District's service area. If and when recycled water becomes available within the District's service area in the future, appropriate financial incentives would be considered to encourage recycled water use.

Table 5.7 – Methods to Expand Future Recycled Water Use (DWR Table 6-6)

☒	Supplier does not plan to expand recycled water use in the future. Supplier will not complete the table below but will provide narrative explanation.		
	Provide page location of narrative in UWMP		
Name of Action	Description	Planned Implementation Year	Expected Increase in Recycled Water Use
--	--	--	--
Total			--

5.4 WATER TRANSFERS

*10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:
10631(d) Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.*

Water transfers between SCWA's Water Contractors are authorized under the Restructured Agreement. Transfers between the Water Contractors have been necessary in the past and may continue to be necessary in the future to improve water reliability. The District does not include water transfers in the water supply projections presented in this Plan because they will be pursued on an as-needed basis.

5.5 DESALINATED WATER OPPORTUNITIES

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

The District has no plans for desalination and no desalinated water is anticipated to be available within the District's service area over the forecast timeframe. However, the District is within approximately 15 miles of the San Pablo Bay and desalination of bay water is a possibility. Brackish or impaired groundwater is also present between Petaluma and San Pablo Bay; therefore, desalination of groundwater is a possibility in the future. No desalinated water supplies are projected for this Plan.

5.6 POTENTIAL WATER SUPPLY PROJECTS AND PROGRAMS

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

The District is working with the SCWA, the City of Sonoma and other interested participants in a groundwater banking pilot testing project within the Basin. Currently the District has identified two locations to test groundwater banking and is installing an additional groundwater monitoring well to help determine the feasibility of groundwater banking. The District expects that the groundwater banking pilot testing project will be completed by 2020.

The District's future water supply projects and programs are summarized in Table 5.8. The expected increases in the water supply available to the District listed below are speculative and have not been incorporated into the District's water supply projections.

Table 5.8 – Expected Future Water Supply Projects or Programs (DWR Table 6-7)

Name of Future Projects or Programs	Joint Project with other agencies?		Description (if needed)	Planned Implementation Year	Planned for Use in Year Type	Expected Increase in Water Supply to Agency (AFY)
	(y/n)	Agency Name				
Groundwater Banking	Yes	SCWA, City of Sonoma	Pilot project	2020	All Year Types	0 - 50

5.7 SUMMARY OF EXISTING AND PLANNED SOURCES OF WATER

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 described in subdivision 10631(a).
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.

The District purchases potable water from the SCWA to meet the majority of the water demands within the District's service area. In 2015, the District purchased approximately 1,947 AF of water from SCWA. The remainder of the District's water supply was obtained from local production of groundwater. In 2015, the District produced 581 AF of groundwater. The District's water supplies in 2015 are summarized in Table 5.9.

Table 5.9 – Water Supplies — Actual (DWR Table 6-8)

Water Supply	Additional Detail on Water Supply	2015		
		Actual Volume (AF)	Water Quality	Total Right or Safe Yield (AF)
Purchased or Imported Water	SCWA Purchases	1,947	Drinking Water	3,200
Groundwater	--	581	Drinking Water	--
Total		2,528	--	3,200

Given the uncertainty of the implementation of SGMA, the District plans to continue to purchase wholesale water from SCWA, while monitoring its production of groundwater. The District does not anticipate developing additional long-term water supplies from other sources in the near future. Water supplies from the SCWA through 2040 are projected to be equivalent to the District's annual entitlement of 3,200 AFY, established in the Restructured Agreement and

**VALLEY OF THE MOON WATER DISTRICT
2015 URBAN WATER MANAGEMENT PLAN**



effective through 2037. The District's total water supply projections are shown in Table 5.10 in five-year increments through 2040.

Table 5.10 – Water Supplies — Projected (DWR Table 6-9)

Water Supply	Additional Detail on Water Supply	Projected Water Supply (AFY)				
		2020	2025	2030	2035	2040
		Reasonably Available Volume	Reasonably Available Volume	Reasonably Available Volume	Reasonably Available Volume	Reasonably Available Volume
Purchased or Imported Water	SCWA Purchases	3,200	3,200	3,200	3,200	3,200
Groundwater	Local Production	450	327	232	100	100
Total		3,650	3,527	3,432	3,300	3,300



6. WATER SUPPLY RELIABILITY

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.
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.

As described in Section 5, the District's water supplies consist of purchases from the SCWA and local groundwater production. This section describes the constraints on those potable water supply sources, as well as the management strategies the District will employ to address these constraints. This section also provides an estimate of the supply volumes available to the District and the corresponding supply and demand reliability assessments in normal years, single dry years, and multiple dry year periods.

6.1 CONSTRAINTS ON WATER SUPPLIES

The following sections discuss the factors impacting the reliability of the District's water supplies, including climatic and legal constraints associated with SCWA water supply shortages and environmental constraints associated with water supply operations on the Russian River. The District's groundwater supply is considered to be 100% reliable in all year types.

6.1.1 SCWA Water Shortage Allocations

During periods of shortage, Section 3.5 of the Restructured Agreement provides a method for allocating water among the various Water Contractors and other customers of the SCWA water supply. On 18 April 2006, the SCWA's Board of Directors adopted Resolution No. 06-0342, which approved a methodology for allocating water in the event of a water supply shortage or in the event of a temporary impairment of the capacity of the SCWA's transmission system. This methodology first restricts the delivery of surplus water and then caps water deliveries to each Water Contractor at its respective annual entitlement. If further reductions are required, Section 3.5 of the Restructured Agreement provides a guaranteed supply to each Water Contractor equal to the quantity of water required for human consumption, sanitation, and fire protection.⁹ The remaining water is then allocated to each Water Contractor proportionately based up their respective annual entitlements, up to a maximum equal to its "reasonable requirement."

The SCWA and its Water Contractors are in the process of updating the water shortage allocation methodology. The water supply reliability projections presented in this Plan reflect the new methodology as it is likely to govern supply allocations during periods of water shortage over the forecast timeframe. The updated methodology utilizes the same allocation principles

⁹ If the total available supply is insufficient to meet each Water Contractor's human health demands, then the allocation for each contractor is based on the percentage of each contractor's human health demands to the total human health demands of all contractors.



established under the Restructured Agreement, but refines the calculation of the human health demands and reasonable requirements. Under the revised methodology, the District's human health, sanitation, and fire flow needs are determined to be 1,716 AFY, whereas its reasonable requirement is 2,908 AFY.¹⁰ Based on the annual entitlements included in the Restructured Agreement, the District's annual entitlement of 3,200 AFY represents 4.1 percent of the total entitlements of all Water Contractors (77,445 AFY). Therefore, in the event of a water supply reduction imposed by SCWA, the District will receive its human health needs of 1,716 AFY plus 4.1 percent of the remaining water supply, up to a maximum of 2,908 AFY.

The SCWA has provided the Water Contractors with water supply reliability projections for use in their respective UWMPs. As discussed in Section 1.3.1, the District has relied upon these projections for its water supply reliability projections in this Plan. The SCWA reliability projections are discussed for normal years, single dry years, and multiple dry years in Section 6.2.

6.1.2 Russian River Environmental Constraints

In September 2008, a final Biological Opinion ("BO") was released by the National Marine Fisheries Service ("NMFS") and issued to the SCWA, the USACE, the California Department of Fish and Game, and the Mendocino County Russian River Flood Control and Water Conservation Improvement District. The Russian River BO determined that steelhead and coho salmon were jeopardized by the flood control and water supply operations conducted by SCWA and the USACE. The primary threats to these species were identified as high summertime flows in the Russian River and Dry Creek, high summertime water velocity in Dry Creek, and the practice of breaching the sandbar at the estuary. The terms of the Russian River BO impact the SCWA's water supply operations and subsequent delivery to its Water Contractors, including the District.

The Russian River BO presents a 15-year plan for the elimination or reduction of impacts to salmonids due to water supply and flood control activities in the Russian River watershed. The specific measures included in the BO include the following "reasonable and prudent alternatives":

- Extensive monitoring of both habitat and fish in Dry Creek, the estuary, and the Russian River;
- Eliminating impediments to fish migration and improving habitat on several streams;
- Restoring up to six miles of habitat in Dry Creek and studying a bypass project;
- Requesting the SWRCB to reduce summertime flows in the Russian River; and
- Creating a freshwater lagoon in the estuary at the mouth of the Russian River during the summer months.

¹⁰ The updated methodology has not been finalized and these values are subject to change.

Under the terms of the BO, minimum flow requirements were reduced for normal year scenarios and dry year scenarios. The BO acknowledged a need for balance and flexibility and noted that SCWA may find alternative minimum flow requirements that meet the goals of restoring functional salmonid-rearing habitat while promoting water conservation and limited adverse effects on other in-stream resources. For a more complete and comprehensive discussion of minimum flow requirements, refer to SCWA's UWMP.¹¹

6.2 PROJECTED WATER SUPPLY RELIABILITY

10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:
10631. (c) Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable, and provide data for each of the following:

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

10631 (k) Urban water suppliers that rely upon a wholesale agency for a source of water, shall provide the wholesale agency with water use projections from that agency for that source of water in five-year increments to 20 years or as far as data is available. The wholesale agency shall provide information to the urban water supplier for inclusion in the urban water supplier's plan that identifies and quantifies, to the extent practicable, the existing and planned sources of water as required by subdivision (b), available from the wholesale agency to the urban water supplier over the same five-year increments, and during various water -year types in accordance with subdivision (c). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan informational requirements of subdivisions (b) and (c).

The following sections discuss the District's anticipated water supplies during normal years, single dry years, and multiple dry years. The District's total projected water supply relies upon its allocation of SCWA water, which is determined by the water supply projections developed by SCWA. Therefore, the supply projections presented in the following sections rely upon SCWA water supply projections provided to the District.¹² For each normal and dry year scenario, the SCWA water supply and demand projections are first presented. Based upon the projected SCWA supplies in each scenario and the District's anticipated allocation (see Section 6.1.1), the District's total projected supplies are then presented.

6.2.1 Normal Years

The SCWA water projections for normal years are presented in Table 6.1. No supply reductions are projected to occur during normal years over the forecast timeframe.

¹¹ The SCWA's 2015 UWMP is accessible at: www.scwa.ca.gov/uwmp/.

¹² Email from SCWA to the District, dated 19 April 2016.

Table 6.1 – SCWA Projected Supply and Demand, Normal Years

	SCWA Supplies and Demands (AFY)				
	2020	2025	2030	2035	2040
Total Projected SCWA Supply	68,928	73,025	75,836	77,865	78,901
Total Projected Water Contractor Demand	68,928	73,025	75,836	77,865	78,901
<i>Difference</i>	0	0	0	0	0
<i>Difference as Percentage of Demand</i>	0%	0%	0%	0%	0%

The District's projected water supply in normal years is presented in Table 6.2. The District's SCWA water supply represents its anticipated supply allocations based upon the SCWA water supply projections in Table 6.1 and the allocation methodology described in Section 6.1.1. The District anticipates receiving 100% of its total projected water supply in normal years.

Table 6.2 – District Projected Water Supplies, Normal Years

	Projected Water Supplies (AFY)				
	2020	2025	2030	2035	2040
<i>Surface Water Supplies</i>					
Total SCWA Supplies	3,200	3,200	3,200	3,200	3,200
Percent of Normal	100%	100%	100%	100%	100%
<i>Groundwater Supplies</i>					
Total Groundwater Supplies	450	327	232	100	100
Percent of Normal	100%	100%	100%	100%	100%
Total Projected Supplies	3,650	3,527	3,432	3,300	3,300
Percent of Normal	100%	100%	100%	100%	100%

6.2.2 Single Dry Years

The SCWA water projections for single dry years are presented in Table 6.3. Supply reductions are projected to occur starting in 2025 and range from 15 percent in 2025 to 18 percent in 2040.

Table 6.3 – SCWA Projected Supply and Demand, Single Dry Years

	SCWA Supplies and Demands (AFY)				
	2020	2025	2030	2035	2040
Total Projected SCWA Supply	68,928	62,039	63,501	64,370	64,668
Total Projected Water Contractor Demand	68,928	73,025	75,836	77,865	78,901
<i>Difference</i>	0	10,985	12,334	13,495	14,234
<i>Difference as Percentage of Demand</i>	0.0%	15.0%	16.3%	17.3%	18.0%

The District's projected water supply in single dry years is presented in Table 6.4. The District's SCWA water supply represents its anticipated supply allocations based upon the SCWA water supply projections in Table 6.3 and the allocation methodology described in Section 6.1.1. Per the anticipated allocation methodology, the District is anticipated to receive its reasonable requirement of 2,908 AFY during the projected supply reductions occurring after 2025. The District anticipates receiving between 91 and 100 percent of its total projected water supply in single dry years over the forecast timeframe.

Table 6.4 – District Projected Water Supplies, Single Dry Years

	Projected Water Supplies (AFY)				
	2020	2025	2030	2035	2040
<i>Surface Water Supplies</i>					
Total SCWA Supplies	3,200	2,908	2,908	2,908	2,908
Percent of Normal	100%	91%	91%	91%	91%
<i>Groundwater Supplies</i>					
Total Groundwater Supplies	450	327	232	100	100
Percent of Normal	100%	100%	100%	100%	100%
Total Projected Supplies	3,650	3,235	3,140	3,008	3,008
Percent of Normal	100%	92%	91%	91%	91%

6.2.3 Multiple Dry Years

The SCWA water projections for multiple dry years are presented in Table 6.5. No supply reductions are projected to occur during multiple dry years over the forecast timeframe.

Table 6.5 – SCWA Projected Supply and Demand, Multiple Dry Years

		SCWA Supplies and Demands (AFY)				
		2020	2025	2030	2035	2040
Multiple Dry Year First Year Supply	Total Projected SCWA Supply	68,928	73,025	75,836	77,865	78,901
	Total Projected Water Contractor Demand	68,928	73,025	75,836	77,865	78,901
	<i>Difference</i>	0	0	0	0	0
	<i>Difference as Percentage of Demand</i>	0%	0%	0%	0%	0%
Multiple Dry Year Second Year Supply	Total Projected SCWA Supply	68,928	73,025	75,836	77,865	78,901
	Total Projected Water Contractor Demand	68,928	73,025	75,836	77,865	78,901
	<i>Difference</i>	0	0	0	0	0
	<i>Difference as Percentage of Demand</i>	0%	0%	0%	0%	0%
Multiple Dry Year Third Year Supply	Total Projected SCWA Supply	68,928	73,025	75,836	77,865	78,901
	Total Projected Water Contractor Demand	68,928	73,025	75,836	77,865	78,901
	<i>Difference</i>	0	0	0	0	0
	<i>Difference as Percentage of Demand</i>	0%	0%	0%	0%	0%
Multiple Dry Year Fourth Year Supply	Total Projected SCWA Supply	68,928	73,025	75,836	77,865	78,901
	Total Projected Water Contractor Demand	68,928	73,025	75,836	77,865	78,901
	<i>Difference</i>	0	0	0	0	0
	<i>Difference as Percentage of Demand</i>	0%	0%	0%	0%	0%

The District's projected water supply in multiple dry years is presented in Table 6.6. The District's SCWA water supply represents its anticipated supply allocations based upon the SCWA water supply projections in Table 6.5 and the allocation methodology described in Section 6.1.1. The District anticipates receiving 100 percent of its total projected water supply in all multiple dry year scenarios over the forecast timeframe.

Table 6.6 – District Projected Water Supplies, Multiple Dry Years

		Projected Water Supplies (AFY)				
		2020	2025	2030	2035	2040
Multiple Dry Year First Year Supply	<i>Surface Water Supplies</i>					
	Total SCWA Supplies	3,200	3,200	3,200	3,200	3,200
	Percent of Normal	100%	100%	100%	100%	100%
	<i>Groundwater Supplies</i>					
	Total Groundwater Supplies	450	327	232	100	100
	Percent of Normal	100%	100%	100%	100%	100%
	Total Projected Supplies	3,650	3,527	3,432	3,300	3,300
	Percent of Normal	100%	100%	100%	100%	100%
Multiple Dry Year Second Year Supply	<i>Surface Water Supplies</i>					
	Total SCWA Supplies	3,200	3,200	3,200	3,200	3,200
	Percent of Normal	100%	100%	100%	100%	100%
	<i>Groundwater Supplies</i>					
	Total Groundwater Supplies	450	327	232	100	100
	Percent of Normal	100%	100%	100%	100%	100%
	Total Projected Supplies	3,650	3,527	3,432	3,300	3,300
	Percent of Normal	100%	100%	100%	100%	100%
Multiple Dry Year Third Year Supply	<i>Surface Water Supplies</i>					
	Total SCWA Supplies	3,200	3,200	3,200	3,200	3,200
	Percent of Normal	100%	100%	100%	100%	100%
	<i>Groundwater Supplies</i>					
	Total Groundwater Supplies	450	327	232	100	100
	Percent of Normal	100%	100%	100%	100%	100%
	Total Projected Supplies	3,650	3,527	3,432	3,300	3,300
	Percent of Normal	100%	100%	100%	100%	100%
Multiple Dry Year Fourth Year Supply	<i>Surface Water Supplies</i>					
	Total SCWA Supplies	3,200	3,200	3,200	3,200	3,200
	Percent of Normal	100%	100%	100%	100%	100%
	<i>Groundwater Supplies</i>					
	Total Groundwater Supplies	450	327	232	100	100
	Percent of Normal	100%	100%	100%	100%	100%
	Total Projected Supplies	3,650	3,527	3,432	3,300	3,300
	Percent of Normal	100%	100%	100%	100%	100%

6.3 SUPPLY AND DEMAND ASSESSMENT

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

This section compares the projected availability of the District's supplies, discussed in Sections 5 and 6.2, to the projected demands of the District's customers (see Section 3.2). As described further below, the District's supplies are projected to be sufficient to meet the needs of its customers in normal years and multiple dry years over the forecast timeframe. In single dry years, however, the District is projected to experience a supply shortfall and will need to take additional measures to reduce demand or pursue additional supplies.

6.3.1 Normal Years

As shown in Table 6.7, the District's combined projected water supplies are sufficient to meet projected demands during normal years over the forecast timeframe.

Table 6.7 – Normal Year Supply and Demand Comparison (DWR Table 7-2)

	Projected Supplies and Demands (AFY)				
	2020	2025	2030	2035	2040
Total Projected Supplies	3,650	3,527	3,432	3,300	3,300
Total Projected Demands	3,121	3,125	3,111	3,110	3,117
<i>Difference</i>	<i>529</i>	<i>402</i>	<i>321</i>	<i>190</i>	<i>183</i>
<i>Deficit as Percentage of Demand</i>	--	--	--	--	--

6.3.2 Single Dry Years

As shown in Table 6.8, the District is projected to experience demand shortfalls of 3 percent in single dry years in 2035 and 2040. The District will address such shortfalls by implementing its Water Shortage Contingency Plan as described in Section 7. During the recent drought, the District's customers demonstrated the ability to conserve water to achieve water demand reductions (see Section 3.1). Additionally, the District may address a water supply deficit by producing more groundwater on a short-term basis. Lastly, the District has been conservative in its water supply projections and has not quantified the future water supply projects that may increase the District's water supply in the future (see Section 5.6).

Table 6.8 – Single Dry Year Supply and Demand Comparison (DWR Table 7-3)

	Projected Supplies and Demands (AFY)				
	2020	2025	2030	2035	2040
Total Projected Supplies	3,650	3,235	3,140	3,008	3,008
Total Projected Demands	3,121	3,125	3,111	3,110	3,117
<i>Difference</i>	529	110	29	(102)	(109)
<i>Deficit as Percentage of Demand</i>	--	--	--	3%	3%

6.3.3 Multiple Dry Years

As shown in Table 6.9, the District's combined projected water supplies are sufficient to meet projected demands during multiple dry years over the forecast timeframe.

Table 6.9 – Multiple Dry Years Supply and Demand Comparison (DWR Table 7-4)

		Projected Supplies and Demands (AFY)				
		2020	2025	2030	2035	2040
Multiple Dry Year First Year Supply	Total Projected Supplies	3,650	3,527	3,432	3,300	3,300
	Total Projected Demands	3,121	3,125	3,111	3,110	3,117
	<i>Difference</i>	529	402	321	190	183
	<i>Deficit as Percentage of Demand</i>	--	--	--	--	--
Multiple Dry Year Second Year Supply	Total Projected Supplies	3,650	3,527	3,432	3,300	3,300
	Total Projected Demands	3,121	3,125	3,111	3,110	3,117
	<i>Difference</i>	529	402	321	190	183
	<i>Deficit as Percentage of Demand</i>	--	--	--	--	--
Multiple Dry Year Third Year Supply	Total Projected Supplies	3,650	3,527	3,432	3,300	3,300
	Total Projected Demands	3,121	3,125	3,111	3,110	3,117
	<i>Difference</i>	529	402	321	190	183
	<i>Deficit as Percentage of Demand</i>	--	--	--	--	--
Multiple Dry Year Fourth Year Supply	Total Projected Supplies	3,650	3,527	3,432	3,300	3,300
	Total Projected Demands	3,121	3,125	3,111	3,110	3,117
	<i>Difference</i>	529	402	321	190	183
	<i>Deficit as Percentage of Demand</i>	--	--	--	--	--



6.4 WATER QUALITY

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.

The quality of the District's water deliveries is regulated by the California Drinking Water Program, which requires regular collection and testing of water samples to ensure that the quality meets regulatory standards and does not exceed maximum contaminant levels. The District and the SCWA perform frequent water quality testing, which has consistently yielded results within the acceptable regulatory limits. The current consumer confidence report can be located on the District's website at the following link: <http://www.vomwd.com/qualityreport.php>.

The quality of existing surface water and groundwater sources over the next 25 years is expected to be satisfactory given current treatment practices. Surface water and groundwater will continue to be treated to drinking water standards, and no surface water or groundwater quality deficiencies are foreseen to occur in the next 25 years.

6.5 WATER MANAGEMENT TOOLS

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.

The District actively manages its water demands to minimize the need to import water from other regions. As described in Section 8, the District manages per capita water use through the implementation of a series of DMMs. The Maddaus Demand Analysis provides more detail regarding the District's efforts to manage its water demand (see Appendix C).



7. WATER SHORTAGE CONTINGENCY PLANNING

This section summarizes the District's Water Shortage Contingency Plan ("WSCP"), which is included in full as Appendix G. The District's first WSCP was adopted on 21 January 1992, in response to AB 11X. The District's WSCP was subsequently revised in 1996, 1998, 1999, 2005, and 2014. The WSCP was most recently revised on 7 April 2015, through adoption of Board Resolution No. 150401, to address day per week water restrictions that were mandated by the SWRCB. Among other revisions, the current version of the WSCP includes a new tier for residential billing and provides minor modifications to the water shortage stages. The updated WSCP included in this Plan also gives the District additional flexibility to address supply shortfalls that may result from, but are not limited to: droughts, extreme weather events, natural disasters, extended power outages, reduced deliveries from the SCWA, regulatory droughts, and other water shortage conditions.

Prior to 2014, the District had never implemented its WSCP. Instead, the District relied on Board Resolutions and community outreach and participation to successfully achieve required water use reductions. For example, the District adopted Resolution No. 140304 on 4 March 2014, which expressed support for the SMSWP's conservation efforts and, at the request of SCWA, established a voluntary conservation goal of 20 percent. This resolution did not enact a stage of the District's WSCP. As the historic drought of 2012 through 2015 intensified, however, the SWRCB implemented a series of statewide prohibitions¹³ covering certain water uses and mandated statewide conservation targets that were determined independent of local water supply conditions (see Section 4.5). To achieve its mandated water conservation standard of 20 percent, the District moved from voluntary conservation to mandatory conservation. On 5 August 2014, the District implemented Stage 2 of its WSCP through adoption of Resolution No. 140801. At the same time, the District imposed water shortage charges through adoption of Resolution No. 140802. On 7 April 2015, in response to the SWRCB's continuation of mandatory water conservation requirements, the District extended implementation of Stage 2 of its WSCP through 28 February 2016. On 2 February 2016 the District again extended its Stage 2 declaration. Efforts are underway to petition the SWRCB to rescind its conservation mandate for the District as it's water supplies have returned to normal following a normal year of rainfall.

¹³ On 28 July 2014, the SWRCB adopted emergency regulations to mandate water agencies, including the District, to implement their WSCP and establishing minimum actions to reduce outdoor water use. On 1 April 2015, the Governor of California issued EO B-29-15 directing the SWRCB to impose restrictions to achieve a state-wide 25 percent reduction in potable water use. In order to implement the requirements of EO 5-29-15, the SWRCB adopted Resolution 2015-0032 on 5 May 2015 to mandate further minimum actions by water suppliers and their customers to reduce potable water use into 2016. This resolution assigned a mandatory water conservation savings goal to each water supplier that established a required percentage reduction in residential per capita water use. On 2 February 2016, the SWRCB voted to extend the reduction targets through October 2016.

7.1 STAGES OF ACTION

10632. (a) The plan shall provide an urban water shortage contingency analysis that includes each of the following elements that are within the authority of the urban water supplier: (1) 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.

The District's increasingly stringent stages of action for responding to reduced supply in a water shortage are summarized in Table 7.1.

Table 7.1 – Stages of Water Shortage Contingency Plan (DWR Table 8-1)

Stage	Percent Supply Reduction ¹	Water Supply Condition
1	Up to 25%	Minimal Shortage – Up to 25% (Voluntary)
2	Up to 25%	Moderate Shortage – Up to 25% (Mandatory)
3	35%	Severe Shortage – 26% to 35% (Mandatory)
4	50%	Critical Shortage – 36% to 50% (Mandatory)
¹ One Stage in the Water Shortage Contingency Plan must address a water shortage of 50%.		
NOTES: The appropriate Stage will be enacted to the corresponding estimated water shortage that may result from the following: droughts, extreme weather events, natural disasters, extended power outages, reduced deliveries from the SCWA, regulatory droughts, and other water shortage conditions.		

7.2 GUIDING PRIORITIES

The District's total demand reduction will be achieved by assigning different reduction goals to each water use sector. In order to develop water allocations during a water shortage, the District has established the following priorities, from highest to lowest priority:

- Health and human safety, including non-landscaping residential use;
- Commercial, industrial and institutional;
- Existing landscaping; and
- New demand (i.e., projects without executed District applications/agreements and full payment of District fees).

The demand reductions sought in the District's WSCP reflect the priorities described above. Reduction goals for each water use sector under Stages 2, 3, and 4 of the District's WSCP are summarized in Table 7.2.



Table 7.2 – WSCP Reduction Goals by Customer Class

Customer Class	Stage 2 Reduction Goal	Stage 3 Reduction Goal	Stage 4 Reduction Goal
Single Family Residential	25%	35%	55%
Multi-Family Residential	25%	35%	42%
Commercial / Industrial / Institutional	15%	20%	27%
Dedicated Irrigation	50%	75%	90%
Total	25%	35%	50%

7.3 ALLOCATION AMOUNTS

Under Stages 2, 3, and 4 of the District’s WSCP, customers are assigned an allocated volume of water. When one of these stages is enacted, the allocated volume of water consumption is not to be exceeded. Water use in excess of the customer’s allocation may trigger enforcement by the District, including fines and possibly termination of service (see Section 7.5). The amount of water allocated to each customer sector under Stages 2, 3, and 4 of the District’s WSCP are described below:

- Stage 2: Mandatory program with the goal of 25 percent overall reduction
 - SFR customers receive up to 59 GPCD plus a moderate landscape allotment of 3,000 gallons per month per account from May through October
 - MFR customers receive up to 59 GPCD plus 50 percent historical net evapotranspiration-based demand for the square footage of the irrigated area from May through October (if irrigation is not served by a separate meter).
 - CII accounts receive 85 percent of their historical water use in the most recent 12-month period during which no water shortage demand reduction program was in place.
 - Dedicated irrigation accounts receive a water budget based on 50 percent of historical net evapotranspiration-based demand for the square footage of the irrigated area.
 - Hospitals receive 95 percent of their historical water use in the most recent 12-month period during which no water shortage demand reduction program was in place.
- Stage 3: Mandatory program with the goal of 35 percent overall reduction
 - SFR customers receive up to 59 GPCD plus a minimal landscape allotment of 1,250 gallons per month per account from May through October.



- MFR customers receive up to 59 GPCD plus 25 percent historical net evapotranspiration-based demand for the square footage of the irrigated area from May through October (if irrigation is not served by a separate meter).
 - CII accounts receive 80 percent of their historical water use in the most recent 12-month period during which no water shortage demand reduction program was in place.
 - Dedicated irrigation accounts receive a water budget based on 25 percent of historical net evapotranspiration-based demand for the square footage of the irrigated area.
 - Hospitals receive 90 percent of their historical water use in the most recent 12-month period during which no water shortage demand reduction program was in place.
- Stage 4: Mandatory program with the goal of 50 percent overall reduction
 - SFR customers receive up to 46.5 GPCD with zero gallons per month landscape allotment.
 - MFR customers receive up to 46.5 GPCD with zero gallons per month landscape allotment.
 - CII accounts receive 73 percent of their historical water use in the most recent 12-month period during which no water shortage demand reduction program was in place.
 - Dedicated irrigation accounts receive a water budget based on 10 percent of historical net evapotranspiration-based demand for the square footage of the irrigated area.
 - Hospitals receive 85 percent of their historical water use in the most recent 12-month period during which no water shortage demand reduction program was in place.

7.4 PROHIBITIONS ON END USES

10632. (a) (4) 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.

As discussed in Section 8.2.1, the District adopted Ordinance No. 1007 in 2000 to eliminate intentional or unintentional water waste when a reasonable alternative solution is available. In addition to these mandatory prohibitions, which are in place at all times, the District has incorporated prohibitions against specific water use practices during water shortages. The prohibitions on end uses associated with each Stage of the District's WSCP are summarized below and in Table 7.3.



- Stage 1: Voluntary program with the goal of up to 25 percent overall reduction
 - Irrigation is limited to the hours between 8pm to 6am.
 - Use of any garden or utility hose without a hose-end shut-off nozzle is prohibited.
 - Using potable water for street washing is prohibited.
 - Washing sidewalks, patios, driveways and other hardscapes is prohibited, unless required for public health and safety.
 - Recycled water must be used for construction dust control.
- Stage 2: Mandatory program with the goal of up to 25 percent overall reduction
 - Service of water in restaurants is prohibited, except upon request.
 - Hotels and lodging establishments must offer a linen opt-out service.
 - Actions included under Stage 1 become mandatory and the District begins enforcement (see Section 7.5).
 - Irrigation is limited to three days per week.
- Stage 3: Mandatory program with the goal of up to 35 percent overall reduction
 - All water use prohibitions and requirements established in Stages 1 and 2 remain in effect.
 - Irrigation is limited to two days per week.
 - Operating ornamental fountains is prohibited.
 - Filling new swimming pools is prohibited.
 - No water-using landscape may be installed in new construction.
 - New construction must offset new demand by conserving one times the new demand within the community.
- Stage 4: Mandatory program with the goal of up to 50 percent overall reduction
 - All water use prohibitions and requirements established in Stages 1, 2, and 3 remain in effect.
 - Irrigation is limited to one day per week.
 - No new water-using landscape may be installed by any customer.
 - New construction must offset new demand by conserving two times the new demand within the community.
 - Filling or topping-off of existing swimming pools is prohibited.

Table 7.3 – Restrictions and Prohibitions on End Uses (DWR Table 8-2)

Stage	Restrictions and Prohibitions on End Users	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
Ordinance No. 1007	Other - Prohibit use of potable water for washing hard surfaces	Washing sidewalks, walkways, driveways, parking lots and other hard-surfaced areas by direct hosing is prohibited, unless necessary for public health and safety.	Yes
Ordinance No. 1007	Other - Customers must repair leaks, breaks, and malfunctions in a timely manner	Breaks or leaks are required to be corrected within 72 hours of discovery or notice from the District.	Yes
Ordinance No. 1007	Landscape - Restrict or prohibit runoff from landscape irrigation	Irrigation in manner that allows excessive runoff of water, or unreasonably over-sprays the area of irrigation, is prohibited.	Yes
Ordinance No. 1007	Other - Require automatic shut of hoses	Washing cars, boats, trailers or other vehicles and machinery directly with a hose not equipped with a shutoff nozzle is prohibited.	Yes
Ordinance No. 1007	Water Features - Restrict water use for decorative water features, such as fountains	Use of potable water for non-recycling decorative water fountains is prohibited.	Yes
Ordinance No. 1007	CII - Other CII restriction or prohibition	Use of water for single pass evaporative cooling systems for air conditioning is prohibited for all connections installed after 6 June 2000 unless required for health or safety reasons.	Yes
Ordinance No. 1007	Other - Prohibit vehicle washing except at facilities using recycled or recirculating water	Use of water for new, non-recirculating conveyor car wash systems is prohibited.	Yes
Ordinance No. 1007	CII - Other CII restriction or prohibition	Use of water for new non-recirculating industrial clothes wash systems is prohibited.	Yes
1	Other - Require automatic shut-off hoses	Use of any garden or utility hose without a hose-end shut-off nozzle is prohibited.	No
1	Landscape - Limit landscape irrigation to specific times	Irrigation is limited to the hours between 8pm to 6am.	No
1	CII - Restaurants may only serve water upon request	--	No

Table 7.3 – Restrictions and Prohibitions on End Uses (DWR Table 8-2)

Stage	Restrictions and Prohibitions on End Users	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
1	Other - Prohibit use of potable water for construction and dust control	Recycled water must be used for construction dust control.	No
2	Other - Require automatic shut-off hoses	Use of any garden or utility hose without a hose-end shut-off nozzle is prohibited. This measure is voluntary under Stage 1 and becomes mandatory under Stage 2.	Yes
2	Landscape - Limit landscape irrigation to specific times	Irrigation is limited to the hours between 8pm to 6am. This measure is voluntary under Stage 1 and becomes mandatory under Stage 2.	Yes
2	CII - Restaurants may only serve water upon request	This measure is voluntary under Stage 1 and becomes mandatory under Stage 2.	Yes
2	CII – Hotels and lodging establishments offer a linen opt-out service	--	No
2	Other - Prohibit use of potable water for construction and dust control	Recycled water must be used for construction dust control. This measure is voluntary under Stage 1 and becomes mandatory under Stage 2.	Yes
2	Landscape - Limit landscape irrigation to specific days	Irrigation limited to three days per week.	Yes
3	Landscape - Limit landscape irrigation to specific days	Irrigation limited to two days per week.	Yes
3	Decorative Water Features - Restrict water use for decorative water features, such as fountains	Filling and/or refilling new and existing decorative water features (i.e. ponds, lakes and fountains) is prohibited	Yes
3	Other - Prohibit use of potable water for construction and dust control	Recycled water must be used for construction dust control.	Yes
3	Other water feature or swimming pool restriction	Filling new swimming pools is prohibited.	Yes
4	Landscape - Other landscape restriction or prohibition	No water-using landscape may be installed in new construction.	Yes
4	Other	New construction must offset new demand by conserving one times the new demand within the community.	Yes
4	Landscape - Other landscape restriction or prohibition	No new water-using landscape may be installed by any customer.	Yes

Table 7.3 – Restrictions and Prohibitions on End Uses (DWR Table 8-2)

Stage	Restrictions and Prohibitions on End Users	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
4	Other	New construction must offset new demand by conserving two times the new demand within the community.	Yes
4	Other water feature or swimming pool restriction	Filling or topping-off of existing swimming pools is prohibited.	Yes

7.4.1 Defining Water Features

10632. (b) Commencing with the urban water management plan update due July 1, 2016, for purposes of developing the water shortage contingency analysis pursuant to subdivision (a), the urban water supplier shall analyze and define water features that are artificially supplied with water, including ponds, lakes, waterfalls, and fountains, separately from swimming pools and spas, as defined in subdivision (a) of Section 115921 of the Health and Safety Code.

As required by CWC §10632(b), the District distinguishes between “decorative water features” such as ponds, lakes, and fountains that are artificially supplied with water and “recreational water features” such as swimming pools and spas. As outlined in Table 7.3 above, the District has stricter prohibition on decorative water features compared to pools and spas. Existing decorative water features may be filled or re-filled up to Stage 3 of the WSCP, whereas existing pools and spas are allowed to fill or re-fill up to Stage 4 of the WSCP.¹⁴

7.5 PENALTIES, CHARGES AND OTHER ENFORCEMENT

110632. (a) (6) Penalties or charges for excessive use, where applicable.

Depending on the extent of the water waste the District may, after written notification to customer and a reasonable time to correct the violation as solely determined by the District, take action to enforce the District’s water waste prevention ordinance (Ordinance No. 1007) or the WSCP. Penalties, fees, and charges are established by a resolution adopted by the District’s Board of Directors. While Stages 2, 3, and 4 of the WSCP are in place, customers are subject to potential enforcement action if their water use exceeds the established allotment over two consecutive billing cycles, or exceeds the established allotment in three billing cycles within a twelve month period. Customers are at all times subject to potential enforcement action if they are found to be in violation of one or more of the requirements of Ordinance No. 1007. The

¹⁴ Filling or re-filling of new pools and spas is prohibited under Stage 3 of the WSCP, prior to the prohibitions associated with existing pools and spas.



following actions may be taken, at the discretion of the District's General Manager, to enforce Ordinance No. 1007 and the WSCP:

- At the customer's request and expense, the District will perform a complete site water audit and the customer would be required to install additional water efficient fixtures on the basis of the audit.
- At the customer's expense, the District will install a flow-reducing device at the water meter.
- Disconnection of water service and payment of the then applicable reconnection fee for reconnection of the water service.
- The District may levy a water waste fee to the customer as summarized in Table 7.4.

Table 7.4 – Procedure for Imposing Administrative Fees

District Action	Administrative Fee
Hang door tag notifying customer of water waste issue	No Fee
Issue 1 st letter to customer notifying them of water waste issue (14 days to comply)	No Fee
Courtesy call to customer to discuss resolution of water waste issue	No fee
Issue 2 nd letter and/or hang 2 nd door tag for same water waste issue (7 days to comply)	\$25
Issue 3 rd letter and/or hang 3 rd door tag for same water waste issue (7 days to comply)	\$50
Install flow restrictor if domestic water or turn off if dedicated irrigation meter	\$125
Continued water waste with a flow restrictor in place	\$250

7.6 CONSUMPTION REDUCTION METHODS

10632. (5) 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.

In addition to the assignment of water allocations and prohibitions of specific water uses described in Section 7.3 and 7.4, respectively, the District will conduct actions at each Stage of the WSCP to further reduce water use. These actions are summarized below and in Table 7.5:

- Stage 1: Voluntary program with the goal of up to 25 percent overall reduction
 - Adopt resolution requesting voluntary water conservation with non-allotment-based reduction goals for all user classes and prohibiting water waste and reducing all non-essential uses.
 - Initiate public information campaign, including preparing and disseminating educational brochures and bill inserts and technical information to specific customer types (e.g., Dedicated Irrigation and Commercial).
 - Set up public information booths urging water conservation and showing ways the public can save water.
 - Coordinate media outreach program, including issuing news releases to the media.
 - Explain other stages to the Board of Directors and public through workshops and forecast future actions that may be required should the shortage continue or worsen.
- Stage 2: Mandatory program with the goal of up to 25 percent overall reduction
 - Adopt rationing ordinance assigning Stage 2 allotment to each water service, as described in Section 7.3.
 - Adopt resolution to implement Stage 2 Water Shortage Charges (see Section 7.8).
 - Increase District staffing support, including adding temporary position to staff phone lines, performing patrols for water waste violations, and conducting customer water use audits.
 - Increase public education and outreach campaign.
- Stage 3: Mandatory program with the goal of up to 35 percent overall reduction
 - Adopt rationing ordinance assigning Stage 3 allotment to each water service, as described in Section 7.3.
 - Adopt resolution to implement Stage 3 Water Shortage Charges (see Section 7.8).
 - Increase public education and outreach campaign.
 - Establish construction water demand offset program.

- Expand efforts to patrol for water waste violations and conduct customer water use audits.
- Stage 4: Mandatory program with the goal of up to 50 percent overall reduction
 - Adopt rationing ordinance assigning Stage 4 allotment to each water service, as described in Section 7.3.
 - Adopt resolution to implement Stage 4 Water Shortage Charges (see Section 7.8).
 - Increase public education and outreach campaign.
 - Promote participation in construction water demand offset program.
 - Expand efforts to patrol for water waste violations and conduct customer water use audits.

Table 7.5 – Stages of Water Shortage Contingency Plan - Consumption Reduction Methods (DWR Table 8-3)

Stage	Consumption Reduction Methods by Water Supplier	Additional Explanation or Reference
1	Other	Adopt resolution requesting voluntary water conservation with non-allotment-based reduction goals for all user classes and prohibiting water waste and reducing all non-essential uses.
1	Expand Public Information Campaign	Initiate public information campaign, including preparing and disseminating educational brochures and bill inserts and technical information to specific customer types (e.g., Dedicated Irrigation and Commercial). Set up public information booths urging water conservation and showing ways the public can save water. Coordinate media outreach program, including issuing news releases to the media.
1	Other	Explain other stages to the Board of Directors and public through workshops and forecast future actions that may be required should the shortage continue or worsen.
2	Other	Adopt rationing ordinance assigning Stage 2 allotment to each water service, as described in Section 7.3.
2	Implement or Modify Drought Rate Structure or Surcharge	Adopt resolution to implement Stage 2 Water Shortage Charges (see Section 7.8).
2	Offer Water Use Surveys	Increase District staffing support in order to conduct more customer water use audits.

**Table 7.5 – Stages of Water Shortage Contingency Plan - Consumption Reduction Methods
(DWR Table 8-3)**

Stage	Consumption Reduction Methods by Water Supplier	Additional Explanation or Reference
2	Increase Water Waste Patrols	Increase District staffing support in order to perform more patrols for water waste violations.
2	Expand Public Information Campaign	Increase public education and outreach campaign implemented in Stage 1.
3	Other	Adopt rationing ordinance assigning Stage 3 allotment to each water service, as described in Section 7.3.
3	Implement or Modify Drought Rate Structure or Surcharge	Adopt resolution to implement Stage 3 Water Shortage Charges (see Section 7.8).
3	Expand Public Information Campaign	Increase public education and outreach campaign implemented in Stage 1 and expanded in Stage 2.
3	Other	Establish construction water demand offset program.
3	Offer Water Use Surveys	Expand efforts to offer customer water use audits.
3	Increase Water Waste Patrols	Expand efforts to patrol for water waste violations.
4	Other	Adopt rationing ordinance assigning Stage 4 allotment to each water service, as described in Section 7.3.
4	Implement or Modify Drought Rate Structure or Surcharge	Adopt resolution to implement Stage 4 Water Shortage Charges (see Section 7.8).
4	Expand Public Information Campaign	Increase public education and outreach campaign implemented in Stage 1 and expanded in Stages 2 and 3.
4	Implement or Modify Drought Rate Structure or Surcharge	Promote participation in construction water demand offset program established in Stage 3.
4	Offer Water Use Surveys	Expand efforts to offer customer water use audits.
4	Increase Water Waste Patrols	Expand efforts to patrol for water waste violations.

7.7 DETERMINING WATER SHORTAGE REDUCTIONS

10632. (a) (9) A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.

The District's wells and SCWA supply turnouts are all equipped with water meters. In addition, each potable water customer is metered. Non-residential landscape irrigation is metered separately from indoor use at most non-residential sites. The District reads meters on a bi-monthly basis and is able to document both demand reductions and high water users. During a supply shortage, the District will continue to monitor water use on this schedule to determine the effectiveness of the customer response to the implementation of the WSCP. Actual water savings achieved by implementing the WSCP will be determined by comparing water consumption records while the WSCP is in place with an appropriate baseline consumption.

7.8 REVENUE AND EXPENDITURE IMPACTS

10632 (a) (7) An analysis of the impacts of each of the actions and conditions described in paragraphs (1) to (6), 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.

As described further in Section 8.2.3, the District employs a four-tiered, conservation-oriented, inclining block water rate structure for residential customers. The District's current tiered water rate structure is designed to encourage efficient water use, even during normal water supply conditions. During a period of water shortage, however, water rates are subject to change. Changes to the water rate structure during each stage of action are designed to encourage all District customers to reduce their water use in accordance with the District's water allocations and reduction goals. In addition, the rate structure changes are also necessary to help protect the financial condition of the District's water system as water demands are reduced below normal/budgeted amounts.

While designed to protect the District's financial condition, the conservation-oriented rate structure to be used during a water shortage also introduces financial risk for the District because some fixed costs are recovered through the commodity rate, which is based on total water usage. Currently, the District's receives 18 percent of its revenue from service charges and 82 percent from commodity rates. A reduction in water usage *may* result in commodity rate revenues not covering all of the District's fixed costs.

Two lines of action for fiscal prudence are incorporated into the District's water shortage financial strategy and rate structure.

1. To absorb the financial deficit caused by a reduction in water rate revenues (due to lower water sales) that exceeds the reduction in costs, the District's reserves will be drawn down in a manner consistent with the District's reserve policy that is in place at the time of the shortage.

2. During Stages 2, 3 and 4, customers will be subject to an increased commodity rate (Water Shortage Charge [“WSC”]) to encourage water conservation by all customers and to help protect the financial condition of the District.

In FY 2014-15, the District implemented a WSC. However, when the District’s customers conserved water above and beyond the conservation target, the District recovered less than expected revenues. In this instance, the District was able to balance its budget by purchasing less water from SCWA than was originally planned. However, in order to prevent similar issues in the future, a small WSC has been added to Tier 1 water use in a Stage 2 shortage.

Under Stage 1 of the WSCP, the District’s reserves will be employed to offset the loss of revenue from reduced water sales and the added costs for the water shortage response effort. Since Stage 1 is a voluntary stage, no changes to the water rate structure are planned during this stage. By withholding WSCs in Stage 1, the District is exposed to some financial risk that depends on the level of conservation actually achieved.

Under Stages 2, 3 and 4 of the WSCP, the District will experience a reduction in net revenue brought on by mandatory reductions in water sales and increased costs for the water shortage response effort. These impacts are planned to be mitigated by the use of available reserves and the introduction of a WSC on each unit of water sold.

Table 7.6 summarizes the WSCs that the District will implement in conjunction with implementation of Stages 1 through 4 of the WSCP. The WSC is designed such that customers meeting allocation limits during Stages 2, 3, and 4 will have lower water bills than they do with normal usage

Table 7.6 – Water Shortage Charges

WSCP Stage	Tier 1	Tier 2	Tier 3	Tier 4	Flat Rate	Irrigation Rate
Stage 1 Up to 25% Shortage	No WSC	No WSC	No WSC	No WSC	No WSC	No WSC
Stage 2 Up to 25% Shortage	Current Rate + 5%	Current Rate + 10%	Current Rate + 25%	Current Rate + 50%	Current Rate + 10%	Current Rate + 50%
Stage 3 26% to 35% Shortage	Current Rate + 10%	Current Rate + 25%	Current Rate + 50%	Current Rate + 75%	Current Rate + 25%	Current Rate + 75%
Stage 4 36% to 50% Shortage	Current Rate + 25%	Current Rate + 50%	Current Rate + 75%	Current Rate + 100%	Current Rate + 50%	Current Rate + 100%

Table 7.7 details the District’s projected annual revenue and expenditure status in non-shortage conditions and at each mandatory Stage in the water shortage program.

Table 7.7 – Impact of Water Shortage on Revenues and Expenditures

	Normal Supply FY 2015-16	Stage 2 25% Shortage	Stage 3 35% Shortage	Stage 4 50% Shortage
<i>Sources of Funds</i>				
Service Charge Revenues	\$880,456	\$880,456	\$880,456	\$880,453
Commodity Rate Revenues (a)	\$4,010,964	\$2,707,401	\$2,206,030	\$1,604,386
Water Shortage Revenues (b)	\$0	\$125,000	\$250,000	\$375,000
Excess Use Charge	\$0	\$0	\$50,000	\$50,000
Other Operating Revenues	\$77,000	\$77,000	\$77,000	\$77,000
Total Sources of Funds	\$4,968,420	\$3,789,857	\$3,463,486	\$2,986,839
<i>Uses of Funds</i>				
Purchased Water (c)	\$1,795,820	\$1,346,865	\$1,167,283	\$897,910
Salaries & Benefits	\$1,454,160	\$1,454,160	\$1,454,160	\$1,454,160
Operations & Maintenance	\$634,050	\$634,050	\$634,050	\$634,050
Water Shortage Prog. Exp. (d)	\$0	\$15,000	\$25,000	\$50,000
Debt Service Payment	\$272,377	\$272,377	\$272,377	\$272,377
Transfer to Capital Impr. Proj.	\$812,013	\$812,013	\$812,013	\$812,013
Total Uses of Funds	\$4,968,420	\$4,534,465	\$4,364,883	\$4,120,510
Surplus/(Deficit)	\$0	(-\$744,608)	(-\$901,397)	(-\$1,133,671)
<i>State of District Reserves</i>				
Beginning Reserves (e)	\$1,320,000	\$1,320,000	\$1,320,000	\$1,320,000
Ending Reserves	\$1,320,000	\$575,392	\$418,603	\$186,329

- (a) Commodity revenues will decline disproportionate to the volume of water sold due to customer reducing use from higher tiers.
- (b) Under Stages 2, 3, and 4 of the District's WSCP, WSCs will be imposed to limit the deficit (see Table 7.6).
- (c) Purchased water costs will be reduced in proportion with water sales.
- (d) Additional estimated expenditures associated with water shortage program
- (e) Emergency reserves are assumed to be \$1,320,000 at start of shortage (budgeted to increase to \$2,600,000 by FY 2019-20).

The financial scenarios depicted in Table 7.7 illustrate several key points. For a single-year water supply shortage, District reserves are anticipated to be sufficient to make-up the projected revenue shortfall. However, if Stage 4 of the WSCP is implemented for multiple years, the entire reserve could be depleted. If such a scenario is anticipated, the District may consider increasing the WSCs to ensure the financial health of the District through a protracted drought period. Furthermore, the transfer of funds for capital projects – which is held constant during all stages – may be reduced to prevent the reserves from dropping below a prudent level, as defined by the adopted reserve policy.



7.9 WATER SHORTAGE CONTINGENCY ORDINANCE AND RESOLUTION

10632 (a) (8) A draft water shortage contingency resolution or ordinance.

The District enacts each stage of action of its WSCP through the adoption of a resolution by the District's Board of Directors. A draft Water Shortage Resolution is included as Appendix H.

7.10 CATASTROPHIC SUPPLY INTERRUPTION PLAN

10632 (a) (3) 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.

Catastrophic supply interruptions may be caused by a regional power outage, an earthquake, or other disaster. In accordance with the Emergency Services Act, the District has developed an Emergency Operation Plan ("EOP"). This EOP guides response to unpredicted catastrophic events that might impact water delivery including regional power outages, earthquakes, or other disasters. The EOP outlines standard operating procedures for all levels of emergency, from minor accidents to major disasters. The District's EOP has been coordinated with the SCWA and neighboring water purveyors. A summary of the actions included in the EOP for specific catastrophic effects is presented in Table 7.8.

Table 7.8 – Emergency Operations Plan Summary

Possible Catastrophe	Summary of Action
Earthquake	Shut-off isolation valves and use emergency temporary water main to bypass ruptured lines
	Storage supplies to be used for SCWA interruption
	Potable and stationary emergency generators available for District facilities
	Mutual aid plans and responders identified
	Procedures for assessing water quality, notifying public and disinfecting system
Flooding	Potable and stationary emergency generators available for District facilities
	Storage supplies to be used for SCWA interruption
	Procedures for assessing water quality, notifying public and disinfecting system
Toxic Spills (SCWA service interruption)	Use of local groundwater
	Procedures for assessing water quality, notifying public and disinfecting system
Fire	Storage supplies to be use for fire flows
	Mutual aid plans and responders identified
	Potable and stationary emergency generators available for District facilities
Power outage or grid failure	Potable and stationary emergency generators available for District facilities
Severe winter storms	Potable and stationary emergency generators available for District facilities
Hot weather	Potable and stationary emergency generators available for District facilities

7.11 ESTIMATE OF MINIMUM SUPPLY FOR NEXT THREE YEARS

10632 (a) (2) 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.

The minimum water supply available for the next three years during a multiple year drought is shown in Table 7.9. Because the District has based its planning on the SCWA's current water rights and because these current water rights are more restrictive than the multiple-dry year condition, this minimum water supply analysis is identical to the normal water year analysis. The



data provided in Table 7.9 reflects 3,200 AFY of SCWA water and 450 AFY of District groundwater.

Table 7.9 – Minimum Supply Next Three Years (DWR Table 8-4)

	Projected Minimum Water Supply (AFY)		
	2016	2017	2018
Available Water Supply	3,650	3,650	3,650

7.12 WATER SHORTAGE CONTINGENCY PLAN IMPLEMENTATION

In the event of a water shortage, the District's Board of Directors shall conduct at least one publicly noticed hearing at which the General Manager shall present a summary of the current water supply conditions, the anticipated water demands by District customers, and the General Manager's recommendations for actions to be taken by the Board in light of the totality of the circumstances. If the Board of Directors finds and determines that the District is facing a water shortage, it will at that time adopt a resolution, such as that presented in Appendix H of this Plan, to declare the existence of a water shortage and to establish the stage of action to be implemented and demand reduction goals to be achieved.

8. DEMAND MANAGEMENT MEASURES

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:
(1) (A) For an urban retail water supplier, as defined in Section 10608.12, a narrative description that addresses the nature and extent of each water demand management measure implemented over the past five years. The narrative shall describe the water demand management measures that the supplier plans to implement to achieve its water use targets pursuant to Section 10608.20.
(1) (B) The narrative pursuant to this paragraph shall include descriptions of the following water demand management measures:
(i) Water waste prevention ordinances.
(ii) Metering.
(iii) Conservation pricing.
(iv) Public education and outreach.
(v) Programs to assess and manage distribution system real loss.
(vi) Water conservation program coordination and staffing support.
(vii) Other demand management measures that have a significant impact on water use as measured in gallons per capita per day, including innovative measures, if implemented.

This section provides an overview of the District's current and planned DMMs, which include specific types and groupings of water conservation measures typically implemented by water suppliers. As discussed in Section 4.5, implementation of the District's DMMs is a key component of the District's water use reduction plan. Implementation of DMMs over the past five years has helped the District achieve its 2015 Interim Water Use Target under SBx7-7, and implementation of DMMs over the next five years is expected to enable the District to meet its 2020 Water Use Target. This section estimates the overall conservation savings estimated to occur as a result of implementing the District's planned water conservation program.

The Guidebook has modified the standard DMMs to be included in 2015 UWMPs from the traditional list of 14 specific conservation measures that coincided with the 14 Best Management Practices ("BMPs") in the original California Urban Water Conservation Council's ("CUWCC") Memorandum of Understanding. In this UWMP, the DMMs are listed and described consistently with the Guidebook. The Maddaus Demand Analysis (see Appendix C) identifies three conservation categories: Tier 1, Tier 2, and New Development Standards ("ND"). Tier 1 refers to the DMMs in the CUWCC reporting form. Tier 2 refers to DMMs that are "above and beyond" the Tier 1 measures and can apply to new or existing development. The ND category refers to conservation standards and requirements that are applicable to new development.

8.1 REGIONAL WATER CONSERVATION

As discussed in Section 1.3.2 and Section 4.3.2, the District is a member of a regional water conservation program in the form of the SMSWP. This partnership was formed in 2010 to encourage regional conservation programs and messaging and for the regional compliance option for SBx7-7. The SMSWP is comprised of the District, the Cities of Santa Rosa, Rohnert Park, Sonoma, Cotati, Petaluma, Town of Windsor, North Marin Water District, California-American

VALLEY OF THE MOON WATER DISTRICT 2015 URBAN WATER MANAGEMENT PLAN



Water Company (the Partners) and SCWA. The purpose of the SMSWP is to establish financial obligations, identify and recommend implementation of water conservation projects, and maximize implementation of cost-effective projects. The SMSWP coordinates media efforts in the region related to water use efficiency and provides support to members that need additional assistance meeting conservation targets.

The SCWA coordinates the work of the SMSWP in conjunction with the WAC (see Section 1.3.1) which provides input to SCWA and holds certain powers and responsibilities enumerated in the Restructured Agreement. The SMSWP is committed to continued water conservation and, as discussed in Section 4.4, is on track to meet long-term water conservation targets. The contact information for the SMSWP Conservation Coordinator is:

Name: Carrie Pollard
Phone: 707-547-1968
Email: carriep@scwa.ca.gov

Funding

The SCWA's wholesale water conservation programs are funded by the Partners annually through the budget recommended by the WAC, which allocates a Water Conservation Subcharge for each AF of water sold. The Partners have agreed to expend \$15 million on water conservation implementation from July 2008 through July 2018.

The SCWA pursues grant funding on behalf of the SMSWP to off-set some of the programmatic costs associated with water use efficiency programs and to test new water-conserving technology. In the last five years, the SCWA has been awarded over \$3,240,000 for implementing water use efficiency programs in the region.

Annual Report

The Partners are committed to remain as members in good standing of the CUWCC and implement BMPs for water conservation. The Partners will implement or use best efforts to secure the implementation of any water conservation requirements and will publish an Annual Report to track progress. The Annual Report will track program implementation, highlight program milestones, and reinforce the importance of protecting and preserving water resources for future generations. The 2014-2015 Annual Report for the SMSWP is attached in Appendix I.

Water Education Program

The SMSWP's Water Education Program is a comprehensive approach to helping educators teach students the "value" of water as an important natural resource. Water conservation and stewardship of the local watersheds is promoted throughout the program. Students are encouraged to use water wisely and make environmentally sustainable choices to help secure a reliable source of freshwater now and in the future. The program includes the following opportunities for students:

- Classroom instructional presentations;
- Field study opportunities;



- Free curriculum materials aligned with the existing California State Frameworks and the California Science Standards;
- A lending library of videos, interactive models and printed materials;
- A newsletter for teachers; and
- Endorsement, participation, and financial sponsorship of events, assemblies and workshops.

All of the Water Education Program opportunities and materials are free to teachers in the service area. The service area covers over 200 schools throughout Sonoma and northern Marin counties.

The total number of students receiving direct instruction in FY 2014-15 was 10,520: 2,564 students in the field study programs, 4,256 in the classroom only programs, 1,775 students in the secondary education program, and 1,925 students in the kinder/transitional kinder program. An additional 356 adults participated in the field study program while serving as adult chaperones with the participating classes.

Public Outreach Program

Each year the SMSWP develops a regional outreach campaign that aligns with our current water supply conditions and promotes water use efficiency programs. The following campaigns have been promoted over the last five years:

- There's Never Enough to Waste. Turn the Water Off (2015);
- There's a Drought On. Turn the Water Off (2014);
- The 20 Gallon Challenge (2013); and
- Save our Water (2011 and 2012).

The SCWA, in collaboration with the members of the SMSWP, produces collateral material that aligns with each specific campaign. The SCWA coordinates an annual media buy that includes outreach in English and Spanish. Each member of the SMSWP can choose to supplement the campaign with their own media buys. Media buys generally include the following:

- Radio;
- Newsprint in 14 various local publications;
- Sonoma County Fair presence;
- Social Media (Facebook, Twitter, Instagram, YouTube);
- Mall banners; and
- Movie theater trailers.

The SMSWP ran its biggest promotion ever with the Drought Drive-Up event held simultaneously at 10 locations throughout Sonoma and Marin Counties on 23 April 2014. The event distributed over 5,100 custom drought kits. Participants customized their own kits at this



drive-thru event by selecting items from an order sheet so each participant only received what they needed. The following items were distributed at the Drought Drive-Up event:

- Shower buckets;
- WaterSense labeled adjustable spray showerheads;
- Five-minute shower timers;
- WaterSense labeled bathroom faucet aerators;
- WaterSense labeled swivel spray kitchen faucet aerators; and
- Packets of toilet leak test dye tablets.

In total, the SMSWP distributed 3,000 showerheads, 3,000 bathroom faucet aerators, and 1,000 kitchen faucet aerators, not including the fixtures that were provided by the individual Partners that hosted the sites.

After the success of the original Drought Drive-Ups in 2014, four more were scheduled in 2015. Strategic collaborations were formed with local home improvement centers to showcase the importance of saving water during the drought and to promote water efficient products and practices. Friedman's Home Improvement and Garret Ace Hardware donated hundreds of buckets that were given away as part of the drought kits. Both retailers featured water-efficient product displays, including WaterSense-labeled products, in their stores to coincide with the events. Both businesses donated staff time with several enthusiastic employees helping to set up and staff the events. The four events were held in the cities of Windsor, Sonoma, and Santa Rosa. Each kit contained the same material as the 2014 event.

Regional Programs

There are numerous regional programs that are implemented by SCWA on behalf of the SMSWP. The SCWA provides region-wide support, including the following programs:

- Sonoma-Marin High Efficiency Clothes Washer Water Rebate: This program offers a rebate for replacing a top-loading clothes washer with a qualifying front-loading clothes washer.
- Green Business Program: Certification is offered through this program for local businesses that are going "green."
- Qualified Water Efficient Landscaper Training Program: The SCWA offers a no cost professional certification program that educates landscapers about irrigation system auditing.
- Eco-Friendly Garden Tour: Each year, SCWA offers a self-guided garden tour in Sonoma County and North Marin that promotes sustainable landscaping practices.
- Garden Sense: The SCWA offers a free garden consultation program open to all Sonoma County residents. Consultants provide site specific advice on lawn removal, conversion to drop irrigation, and plant selection.
- Sonoma County Plant Guide: The SCWA hosts a website presenting information about low water use, climate appropriate plants.



- Community Resilience Challenge: This program facilitates a community mobilization campaign that inspires thousands of citizens, leaders, and groups to take action to save water, grow food, conserve energy, reduce waste, and build community.

On behalf of the SMSWP, the SCWA promotes new and innovative methods for increasing water use efficiency in our region. Some of the pilot projects that SCWA has participated in include the following:

- SmartMarkets Pilot (The District): A water market that allows for ‘eco-shares’ to be earned for reducing demand and redeemed for various incentives.

The SCWA also participates in numerous regional and statewide initiatives to ensure that the SMSWP is on the forefront of water use efficiency, legislation, and conservation planning. These activities include participation in the following:

- CUWCC committees, including the Residential Committee, Research and Evaluation Committee, Utility Ops Committee, and Landscape Committee;
- California Irrigation Institute;
- Independent Technical Panel;
- College WUE Group;
- Russian River Watershed Association; and
- California Landscape Contractors Association.

The SMSWP has received notable recognition for effective collaboration and program implementation. The SMSWP has received the following awards to date:

- EPA Water Sense Partner of the Year 2015;
- EPA Water Sense Partner of the Year 2014; and
- EPA Water Sense Excellence Award 2013.

The District has been an active participant in the SMSWP over the past five years and anticipates continuing its participation in the regional conservation program over the forecast timeframe.

8.2 DISTRICT WATER CONSERVATION

The District has actively pursued cost-effective conservation efforts for over 25 years. Over this period, the District has implemented a wide variety of conservation measures, including, but not limited to, the following: residential water audits; turf removal rebates; toilet rebates; clothes washer rebates; new construction development standards; public education and outreach; and smart irrigation controller rebates. As discussed in Section 3.1, the District’s service area has a high proportion of residential water use and a significant amount of outdoor water use. Consequently, residential conservation programs produce the most savings. The District’s service area does not have a heavy commercial sector and therefore the conservation potential in this area relatively low.

8.2.1 DMM 1 – Water Waste Prevention Ordinances

In 2000, the District adopted Water Waste Ordinance No. 1007 (see Appendix J). Among other things, Ordinance No. 1007 imposes the following mandates and prohibitions:

- Washing sidewalks, walkways, driveways, parking lots and other hard-surfaced areas by direct hosing is prohibited, unless necessary for public health and safety.
- Breaks or leaks are required to be corrected within 72 hours of discovery or notice from the District.
- Irrigation in manner that allows excessive runoff of water, or unreasonably over-sprays the area of irrigation, is prohibited.
- Washing cars, boats, trailers or other vehicles and machinery directly with a hose not equipped with a shutoff nozzle is prohibited.
- Use of potable water for non-recycling decorative water fountains is prohibited.
- Use of water for single pass evaporative cooling systems for air conditioning is prohibited for all connections installed after 6 June 2000 unless required for health or safety reasons.
- Use of water for new, non-recirculating conveyor car wash systems is prohibited.
- Use of water for new non-recirculating industrial clothes wash systems is prohibited.

The prohibitions and mandates listed above do not apply to any water use associated with the operation and maintenance of fire suppression equipment or water use by the District for water quality flushing and sanitation purposes. Additionally, use of water supplied by a private well or from a reclaimed wastewater, gray water or rainwater utilization system is exempt from the requirements of Ordinance No. 1007. Variances for individual customers may be granted by the District's General Manager, and the decision by the General Manager is subject to appeal to the Board of Directors.

As described in Section 7.4, depending on the extent of the water waste, the District may take action to enforce the requirements of Ordinance No. 1007. Prior to taking enforcement action, the District must provide written notification to the customer and allow a reasonable time to correct the violation. All penalties, fees, and charges associated with the enforcement of the District's water waste prevention ordinance must be established by resolution of the District. On 5 August 2014 the District established a water waste administration fee schedule with the adoption of Resolution No. 140802 (see Table 7.4).

8.2.2 DMM 2 – Metering

Since the inception of the District, water meters have been required on all service connections. Part of the District's strategy for meter calibration includes testing water meters at 20 years of age to determine their accuracy. Due to the high quality of the District's water, the accuracy of 20-year-old water meters routinely exceeds 98 percent. Additionally, larger meters (i.e., 3 inches or larger) are tested bi-annually.



Historically, the District has replaced 5 percent of its meters each year. Due to recent improvements in Advanced Metering Infrastructure (“AMI”) and potential customer service benefits of enhanced metering, the District is currently replacing all of its meters with AMI meters. This replacement will occur over a five year period and is anticipated to be completed in FY 2019-20. The AMI system that is currently being installed has the capability to detect low flow usage at rates that are five times lower than traditional positive displacement meters. Once the consumer engagement portal becomes operational in 2016, customers will be able to go online and look at near-real-time water use records for their accounts.

8.2.3 DMM 3 – Conservation Pricing

The District’s current water rate structure consists of two components: (1) a bi-monthly service charge based on meter size, to recover the fixed cost associated with meter reading and billing, customer service, meter replacement and repair, and a portion of the costs for maintaining the water system; and (2) a commodity rate charge based on the actual amount of water used, measured in billing units (“BUs”) of 1,000 gallons. The conservation-oriented, commodity rate charge was implemented in 2004, when the District adopted an inclining block, three-tier rate structure for residential customers. In 2015, a fourth tier was added through adoption of Resolution No. 150401. The breakpoints between tiers and dollars per tier reflected in the District’s current rate structure are the result of an exhaustive rate study performed that showed higher users cause higher costs to the District. Approximately 82 percent of the District’s revenue is currently obtained through the variable commodity rate, which means that a significant portion of each customer’s bill can be reduced through conservation efforts. Table 8.1 presents for the District’s volumetric rate structure in 2015.



Table 8.1 – Volumetric Water Rates, 2015

Customer Category	Range of BUs (a)	Rate per BU
<i>Single Family</i>		
Tier 1	0–10	\$3.71
Tier 2	11–20	\$5.57
Tier 3	21–30	\$8.36
Tier 4	31+	\$12.54
<i>Multi-Family (Two and Three Units)</i>		
Tier 1	0–15	\$3.55
Tier 2	16–25	\$5.32
Tier 3	26–35	\$7.98
Tier 4	36+	\$11.97
<i>Other</i>		
Commercial/Flat Rate	Per BU	\$5.58
Irrigation Rate (b)	Per BU	\$6.05

- (a) Each BU is 1,000 gallons and the tier break points represent consumption over a two-month period.
- (b) Irrigation rate only applies to dedicated irrigation accounts.

In the event that the District experiences a water supply shortage and Stage 2 of the WSCP is implemented, the District may implement WSCs (see Section 7.8). These rate surcharges are intended to encourage additional conservation and to preserve revenue in order to cover the fixed costs associated with District operations.

8.2.4 DMM 4 – Public Education Outreach

As discussed in Section 8.1, the District is a member of a regional water conservation partnership, the SMSWP, which conducts the bulk of public education efforts in the region. Information provided ranged from promotion of conservation programs, to water supply/quality, and hardware distribution. Some of the public education outreach activities performed by the SMSWP include, but are not limited to, the following:

- Information Booths at Farmers Markets and Fairs: The SMSWP operates information booths at the Sonoma Farmers Market and the Sonoma County Fair, where information is provided to the public regarding the District’s water conservation efforts and programs.
- School Education Curriculum for 3rd and 4th Grade: The SMSWP gives annual presentations regarding water supply and source of water to all 3rd and 4th grade classes in its service area.



- Print, Radio, and Digital Advertisements: The SMSWP provides messaging around conservation and water supply and quality through advertisements in the media. During drought conditions, messages focus on the need for conservation and participation in local rebate programs, using messages such as “There is never enough to waste” and “Drought on, water off.”
- Promotion of Regional Water Conservation Programs: In addition to promoting its own water conservation programs, the SMSWP promotes regional water conservation programs, such as those offered by the SVCSD.

In addition to the activities of the partnership the District also has a robust public education program that conducts the following activities:

- Up-to-Date Website: The District’s water conservation website (<http://www.vomwd.com/conservation.php>) provides messages regarding current drought status, water savings targets, and current conservation programs.
- Water Use Efficiency Workshops: The District hosts workshops that focus on how customers can conserve additional water at their home and business, including information regarding indoor and outdoor water use. During drought conditions, the District sponsors drive-up events where customers can receive information about water conservation and free water-conserving hardware.
- Newspaper Articles: The District reaches out to local newspapers to advocate for articles containing information about the current drought status and water saving targets.
- Social Media: The District regularly posts to Facebook and NextDoor providing up-to-the-minute updates to customers about conservation actions they can take, weather forecasts with recommended watering schedules, the current drought status, water saving targets, and conservation programs

8.2.5 DMM 5 – Programs to Assess and Manage Distribution System Real Loss

The District is aggressive at tackling distribution system loss. As noted in Section 3.1.3, the District routinely performs the AWWA Water Loss Worksheet (M36). This analysis separates water loss into “apparent” and “real” losses. Apparent losses include metering inaccuracies, systematic data handling errors, and unauthorized consumption. Real losses represent water loss attributable to the distribution system and include physical water losses from the pressurized system and storage tanks up to the point of customer consumption. In 2015, real loss in the District’s distribution system was estimated to be approximately 2.7%. Through the 2015 AWWA Water Loss Worksheet, the District also calculated an Infrastructure Leakage Index of less than 1.0, which means its system leakage efforts are above average, according to AWWA score ranges.

In addition to monitoring water loss through the AWWA Water Loss Worksheet, the District actively manages its distribution system to minimize the potential for water loss and frequently monitors the system for leaks. The District conducts system-wide pressure management to prevent pressure spikes and breaks. The District has also installed approximately 100 acoustic leak sensors that continuously monitor for leaks in the distribution system. Until all 2,500 static



acoustic leak sensors are installed (FY 2019-20), a comprehensive manual audit of the entire distribution system will be conducted once every two years using movable ultrasonic leak detection equipment. To proactively minimize the potential for leaks, the District is in the process of replacing all polybutylene water service lines; completion of this effort is anticipated by 2025.

8.2.6 DMM 6 – Water Conservation Program Coordination

The District’s water conservation program is administered by the District’s General Manager, with the support of two office staff and two field staff, depending on the required activity. Through collective efforts, approximately 90 percent of a full-time equivalent staff person is dedicated to the implementation of the District’s water conservation program. Contact information for the District’s conservation program is listed below:

Name: Daniel Muelrath
Phone: 707-996-1037
Email: dmuelrath@vomwd.com

The District currently expends approximately \$300,000 annually on conservation-related activities.

8.2.7 DMM 7 – Other DMMs

The District is implementing all CUWCC Foundational BMPs and is on track with the GPCD compliance track. Additional DMMs performed by the District are listed below:

- Residential Water-Saving Fixtures Give-Aways: The District offers its residential customers free water-saving fixtures. The District encourages its customers to pick up and install the following free water-saving fixtures at the District Office:
 - Low-flow showerheads that use 1.5 gallons per minute (“gpm”);
 - Kitchen aerators that use 1.5 gpm;
 - Bathroom aerators that use 0.50 gpm;
 - Flow-restricting hose nozzles; and
 - Dye tablets to identify leaks.
- Residential High-Efficiency Toilet (“HET”) Rebates: The District, in coordination with SVCSD, locally administers an HET Rebate Program for its residential customers. The HET Rebate Program was initiated in 2007. Under this program, residential customers are eligible to receive up to a \$150 rebate for replacing a toilet that uses more than 1.6 gallons per flush (“gpf”) with a qualifying HET model, which range from 0.8 gpf to 1.28 gpf.¹⁵ This program is funded by SVCSD for sewer customers and by the District for

¹⁵ In order to be eligible for the HET Rebate Program, the home or building at which the toilet is replaced must have been built prior to 1992.



water customers on a private septic system. Between 2010 and 2015, over 1,700 HETs were rebated to District customers.

- Residential Turf Removal Rebates: The District initiated a Turf Removal Rebate Program, or “Cash for Grass,” in 2006. Customers are eligible for a rebate for replacing their existing lawn with water conserving plants, vegetable gardens, and other low-water-using plant material that uses sufficient mulch material around new plants. They must also remove their existing lawn sprinklers and modify the lawn irrigation system so that newly landscaped areas are served through a separate valve that can be controlled independently. Drip irrigation systems must be installed for all new plant material. In order to receive the rebate, customers must agree to not re-install the previous turf; if turf is re-installed, the rebate amount must be refunded to the District. In addition to the turf rebate, customers are eligible to receive a rebate for 25 percent of the cost of mulch and 75 percent of the cost of drip irrigation equipment. The 2015 rebate amounts for SFR and townhouse/condo residential customers are summarized below:
 - *Single-Family Residential:*
 - \$0.50 per square foot of lawn replaced, up to a maximum of \$400
 - Up to \$150 for rebating the cost of equipment and mulch purchases
 - Total maximum rebate of \$550
 - *Townhouse/Condo Residential:*
 - \$0.50 per square foot of lawn replaced, up to a maximum of \$75
 - Up to \$175 for rebating the cost of equipment and mulch purchases
 - Total maximum rebate of \$150

Over the period 2010 through 2015, an average of 10 Turf Removal Rebates were issued per year resulting in over 40,000 square feet of lawn replaced.

- Residential High-Efficiency Clothes Washer (“HEW”) Rebates: The District initiated a HEW Rebate Program prior to 2010. The HEW Rebate Program offers rebates to residential customers who replace their existing clothes washers with a HEW included on the EnergyStar Most Efficient list.¹⁶ In 2015, the District offered a rebate of \$25 for each HEW replaced. Over the period 2010 through 2015, an average of 59 HEW rebates were issued per year.
- Residential Smart Irrigation Controller Rebates: The District offers rebates to residential customers replacing existing irrigation controllers with an EPA WaterSense approved SMART irrigation controller. In 2015, residential customers were eligible to receive a rebate of \$15 per active irrigation station, up to a maximum total rebate of \$150.
- Commercial Landscape Equipment Rebates: The District offers rebates to commercial customers replacing existing irrigation systems with water-conserving equipment. To receive a rebate, customers must first participate in a free water use audit. In 2015, the following rebate amounts were offered to commercial customers:

¹⁶ <http://www.energystar.gov/>

- Irrigation controllers – 50% of equipment cost;
- Matched precipitation rate sprinkler heads – 50% of equipment cost;
- Sub-meters – 50% of equipment cost;
- Drip irrigation equipment – 75% of equipment cost;
- Pressure regulation devices – 75% of equipment cost;
- Irrigation Valves – 75% of equipment cost; and
- Rain shut-off devices – 100% of equipment cost.

In addition to the DMMs implemented by the District, the District markets water conservation programs implemented by the SVCSD, which are primarily targeted at commercial customers. Future DMMs that may be considered by the District are discussed in the Maddaus Demand Analysis (see Appendix C).

8.3 IMPLEMENTATION OVER THE PAST FIVE YEARS

10631. (f) Provide a description of the supplier's water demand management measures. This description shall include all of the following: (1)(A) ... a narrative description that addresses the nature and extent of each water demand management measure implemented over the past five years.

Section 8.2 summarizes the nature and extent of DMMs implemented by the District over the past five years.

8.4 PLANNED IMPLEMENTATION TO ACHIEVE WATER USE TARGETS

*10631.(f) Provide a description of the supplier's water demand management measures. This description shall include all of the following:
(1)(A) ...The narrative shall describe the water demand management measures that the supplier plans to implement to achieve its water use targets pursuant to Section 10608.20.*

To achieve the SBx7-7 water use targets described in Section 4, the District intends to continue and expand implementation of the DMMs discussed above. The demand and conservation technical analysis conducted in the Maddaus Demand Analysis (see Appendix C) identifies and analyzes 25 current and potential future conservation programs and actions that may be implemented by the District to achieve water conservation savings.

The District will continue to participate in the SMSWP and coordinate with SVCSD to offer water conservation programs. In the future, specific program offerings may change as the market evolves. In particular, the District is considering implementation of customer-side leak detection program and a graywater rebate program. The projected water conservation savings from DMMs implemented over the period 2015 through 2040 range from 218 AF to 532 AF depending on the degree to which conservation programs are implemented by the District. Under the most



conservative scenario modeled in the Maddaus Demand Analysis,¹⁷ the District's 2020 projected per capita water use is 112 GPCD, which will meet the District SBx7-7 2020 target of 124 GPCD discussed in Section 4.3.1.

¹⁷ This scenario assumes that no active conservation savings will occur and the only savings will come from passive savings associated with compliance with existing plumbing codes (i.e., Federal Energy Policy Act of 1992, CALGreen Building Code, AB 715, SB 407).



9. PLAN ADOPTION AND SUBMITTAL

Preparation of the District's 2015 UWMP update began in October 2015 for completion in June 2016, with notifications and interactions between stakeholders as discussed further below.

9.1 NOTIFICATION OF UWMP PREPARATION

110621. (b) Every urban water supplier required to prepare a plan pursuant to this part shall, at least 60 days before 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.

The agencies, cities, and counties that were notified by the District of the development of this plan are listed in Table 1.5. A sample copy of the notices is provided in Appendix B. In addition to these notices, the District also included a public notice in the local newspaper notifying the public of the District's intent to prepare its UWMP and soliciting public input during the preparation of the UWMP.

9.2 NOTIFICATION OF PUBLIC HEARING

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

9.2.1 Notice to Cities and Counties

On 21 January 2016, the District sent a letter to the entities listed in Table 1.5 informing them that the Public Review Draft 2015 UWMP would be available for review and welcoming their input and comments on the document. On 25 May 2016, the District sent an email to the same entities informing them that the Public Review Draft 2015 UWMP was available for public review at the District's office and on the District's website.¹⁸ The email also informed the agencies that the UWMP public hearing would be occurring at the District's office on 7 June 2016. A sample copy of the notification letter is included in Appendix B.

¹⁸ www.vomwd.com

9.2.2 Notice to the Public

On 24 May 2016 and 27 May 2016, the District published a notice in the Sonoma Index Tribune informing the public that the 2015 UWMP would be available for public review at District's office and on the District's website. The notice also informed the public that the 2015 UWMP public hearing would be held at the District's office on 7 June 2016. A copy of the newspaper announcement is included in Appendix B.

9.3 PUBLIC HEARING AND ADOPTION

10608.26 (a) In complying with this part, an urban retail water supplier shall conduct at least one public hearing to accomplish all of the following:

- (1) Allow community input regarding the urban retail water supplier's implementation plan for complying with this part.*
- (2) Consider the economic impacts of the urban retail water supplier's implementation plan for complying with this part.*
- (3) Adopt a method, pursuant to subdivision (b) of Section 10608.20, for determining its urban water use target.*

The UWMP was adopted by Resolution No. 160601 by the District's Board of Directors during the 7 June 2016 meeting. A copy of this resolution is included as Appendix K.

9.4 PLAN SUBMITTAL

10621. (d) An urban water supplier shall update and submit its 2015 plan to the department by July 1, 2016.

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.

10644. (a) (1) 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.

10644. (a) (2) The plan, or amendments to the plan, submitted to the department pursuant to paragraph (1) shall be submitted electronically.

A copy of the Final UWMP will be submitted to DWR, the California State Library, and SCWA no later than 30 days after adoption by the Board. An electronic copy of the adopted 2015 UWMP will be submitted to the DWR using the DWR online submittal tool. Plan submittal documentation will be provided in Appendix L.



9.5 PUBLIC AVAILABILITY

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

The Final UWMP is available for public viewing at the District's main office during normal business hours and on the District's website (<http://www.vomwd.com/>).



10. REFERENCES

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- DWR, 2016a. California Department of Water Resources, *Guidebook for Urban Water Suppliers, 2015 Urban Water Management Plan*, dated January 2016.
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- Farrar et al., 2006. Farrar, C.D., Metzger, L.F., Nishikawa, Tracy, Koczot, K.M., and E.G. Reichard, *Geohydrologic characterization, water-chemistry, and ground-water flow simulation model of the Sonoma Valley area*, Sonoma County, California, U.S. Geological Survey Scientific Investigations Report 2006-5092, 167 p., 2006.
- Kunkel and Upson, 1960. Kunkel, F. and J.E. Upson, *Geology and ground water in Napa and Sonoma Valleys*, Napa and Sonoma Counties, California, U.S. Geological Survey Water Supply Paper 1495, 252 p., 1960.
- Maddaus, 2015. Maddaus Water Management, Valley of the Moon Water District – 2015 Urban Water Management Plan Water Demand Analysis and Water Conservation Measures Update
- Luhdorff & Scalmanini, 1999. Luhdorff and Scalmanini, *Master Plan for Ground-Water Development and Management*, prepared for Valley of the Moon Water District, 1999.
- SCWA, 2007. Sonoma County Water Agency, *Sonoma Valley Groundwater Management Plan*, dated December 2007.



**APPENDIX A:
UWMP CHECKLIST**

CWC Section	UWMP requirement	Subject	Guidebook Location	UWMP Section
10620(b)	Every person that becomes an urban water supplier shall adopt an urban water management plan within one year after it has become an urban water supplier.	Plan Preparation	Section 2.1	N/A
10620(d)(2)	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.	Plan Preparation	Section 2.5.2	Section 1.2 and Table 1.1
10642	Provide supporting documentation that the water supplier has encouraged 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.	Plan Preparation	Section 2.5.2	Appendix
10631(a)	Describe the water supplier service area.	System Description	Section 3.1	Section 2
10631(a)	Describe the climate of the service area of the supplier.	System Description	Section 3.3	Section 2.2 and Table 2.2
10631(a)	Provide population projections for 2020, 2025, 2030, and 2035.	System Description	Section 3.4	Section 2.4 and Table 2.3
10631(a)	Describe other demographic factors affecting the supplier's water management planning.	System Description	Section 3.4	Section 2
10631(a)	Indicate the current population of the service area.	System Description and Baselines and Targets	Sections 3.4 and 5.4	Section 2.1 and Figure 2.1
10631(e)(1)	Quantify past, current, and projected water use, identifying the uses among water use sectors.	System Water Use	Section 4.2	Section 3 and Tables 3.1 through 3.7
10631(e)(3)(A)	Report the distribution system water loss for the most recent 12-month period available.	System Water Use	Section 4.3	Section 3.1.3
10631.1(a)	Include projected water use needed for lower income housing projected in the service area of the supplier.	System Water Use	Section 4.5	Section 3.2.2 and Table 3.5

CWC Section	UWMP requirement	Subject	Guidebook Location	UWMP Section
10608.20(b)	Retail suppliers shall adopt a 2020 water use target using one of four methods.	Baselines and Targets	Section 5.7 and App E	Section 4.3, Tables 4.2 and 4.4, and Appendix E
10608.20(e)	Retail suppliers shall 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.	Baselines and Targets	Chapter 5 and App E	Section 4 and Appendix E
10608.22	Retail suppliers' per capita daily water use reduction shall be no less than 5 percent of base daily per capita water use of the 5 year baseline. This does not apply if the suppliers base GPCD is at or below 100.	Baselines and Targets	Section 5.7.2	Section 4.3 and Appendix E
10608.24(a)	Retail suppliers shall meet their interim target by December 31, 2015.	Baselines and Targets	Section 5.8 and App E	Section 4.4 and Tables 4.5 and 4.6
1608.24(d)(2)	If the retail supplier adjusts its compliance GPCD using weather normalization, economic adjustment, or extraordinary events, it shall provide the basis for, and data supporting the adjustment.	Baselines and Targets	Section 5.8.2	N/A
10608.36	Wholesale suppliers shall include an assessment of present and proposed future measures, programs, and policies to help their retail water suppliers achieve targeted water use reductions.	Baselines and Targets	Section 5.1	N/A
10608.40	Retail suppliers shall report on their progress in meeting their water use targets. The data shall be reported using a standardized form.	Baselines and Targets	Section 5.8 and App E	Section 4.4, Tables 4.5 and 4.6, and Appendix E
10631(b)	Identify and quantify the existing and planned sources of water available for 2015, 2020, 2025, 2030, and 2035.	System Supplies	Chapter 6	Section 5 and Tables 5.9 and 5.10
10631(b)	Indicate whether groundwater is an existing or planned source of water available to the supplier.	System Supplies	Section 6.2	Section 5.2 and Tables 5.1 and 5.2

CWC Section	UWMP requirement	Subject	Guidebook Location	UWMP Section
10631(b)(1)	Indicate whether a groundwater management plan has 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.	System Supplies	Section 6.2.2	Section 5.2.2
10631(b)(2)	Describe the groundwater basin.	System Supplies	Section 6.2.1	Section 5.2.1
10631(b)(2)	Indicate if the basin has been adjudicated and include a copy of the court order or decree and a description of the amount of water the supplier has the legal right to pump.	System Supplies	Section 6.2.2	Section 5.2.1
10631(b)(2)	For unadjudicated basins, indicate whether or not the department has identified the basin as overdrafted, or projected to become overdrafted. Describe efforts by the supplier to eliminate the long-term overdraft condition.	System Supplies	Section 6.2.3	Section 5.2.1
10631(b)(3)	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	System Supplies	Section 6.2.4	Section 5.2.4
10631(b)(4)	Provide a detailed description and analysis of the amount and location of groundwater that is projected to be pumped.	System Supplies	Sections 6.2 and 6.9	Section 5.2.5
10631(d)	Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.	System Supplies	Section 6.7	Section 5.4
10631(g)	Describe the expected future water supply projects and programs that may be undertaken by the water supplier to address water supply reliability in average, single-dry, and multiple-dry years.	System Supplies	Section 6.8	Section 5.6
10631(i)	Describe desalinated water project opportunities for long-term supply.	System Supplies	Section 6.6	Section 5.5
10631(j)	Retail suppliers will include documentation that they have provided their wholesale supplier(s) – if any - with water use projections from that source.	System Supplies	Section 2.5.1	Section 1.3.1

CWC Section	UWMP requirement	Subject	Guidebook Location	UWMP Section
10631(j)	Wholesale suppliers will include documentation that they have provided their urban water suppliers with identification and quantification of the existing and planned sources of water available from the wholesale to the urban supplier during various water year types.	System Supplies	Section 2.5.1	N/A
10633	For wastewater and recycled water, coordinate with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area.	System Supplies (Recycled Water)	Section 6.5.1	Section 5.3.1
10633(a)	Describe the wastewater collection and treatment systems in the supplier's service area. Include quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.	System Supplies (Recycled Water)	Section 6.5.2	Section 5.3.2
10633(b)	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.	System Supplies (Recycled Water)	Section 6.5.2.2	Section 5.3.2
10633(c)	Describe the recycled water currently being used in the supplier's service area.	System Supplies (Recycled Water)	Section 6.5.3 and 6.5.4	Section 5.3.3
10633(d)	Describe and quantify the potential uses of recycled water and provide a determination of the technical and economic feasibility of those uses.	System Supplies (Recycled Water)	Section 6.5.4	Section 5.3.3
10633(e)	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.	System Supplies (Recycled Water)	Section 6.5.4	Sections 5.3.3 and 5.3.4
10633(f)	Describe the actions 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.	System Supplies (Recycled Water)	Section 6.5.5	Section 5.3.5

CWC Section	UWMP requirement	Subject	Guidebook Location	UWMP Section
10633(g)	Provide a plan for optimizing the use of recycled water in the supplier's service area.	System Supplies (Recycled Water)	Section 6.5.5	Section 5.3.4
10620(f)	Describe water management tools and options to maximize resources and minimize the need to import water from other regions.	Water Supply Reliability Assessment	Section 7.4	Section 6.5
10631(c)(1)	Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage.	Water Supply Reliability Assessment	Section 7.1	Section 6
10631(c)(1)	Provide data for an average water year, a single dry water year, and multiple dry water years	Water Supply Reliability Assessment	Section 7.2	Section 6.2 and Tables 6.1 through 6.6
10631(c)(2)	For any water source that may not be available at a consistent level of use, describe plans to supplement or replace that source.	Water Supply Reliability Assessment	Section 7.1	N/A
10634	Provide information on the quality of existing sources of water available to the supplier and the manner in which water quality affects water management strategies and supply reliability	Water Supply Reliability Assessment	Section 7.1	Section 6.4
10635(a)	Assess the water supply reliability during normal, dry, and multiple dry water years by comparing the total water supply sources available to the water supplier with the total projected water use over the next 20 years.	Water Supply Reliability Assessment	Section 7.3	Section 6.3 and Tables 6.6 through 6.9
10632(a) and 10632(a)(1)	Provide an urban water shortage contingency analysis that specifies stages of action and an outline of specific water supply conditions at each stage.	Water Shortage Contingency Planning	Section 8.1	Section 7
10632(a)(2)	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.	Water Shortage Contingency Planning	Section 8.9	Section 7.11 and Table 7.9
10632(a)(3)	Identify actions to be undertaken by the urban water supplier in case of a catastrophic interruption of water supplies.	Water Shortage Contingency Planning	Section 8.8	Section 7.12

CWC Section	UWMP requirement	Subject	Guidebook Location	UWMP Section
10632(a)(4)	Identify mandatory prohibitions against specific water use practices during water shortages.	Water Shortage Contingency Planning	Section 8.2	Section 7.4 and Table 7.3
10632(a)(5)	Specify consumption reduction methods in the most restrictive stages.	Water Shortage Contingency Planning	Section 8.4	Section 7.6 and Table 7.5
10632(a)(6)	Indicate penalties or charges for excessive use, where applicable.	Water Shortage Contingency Planning	Section 8.3	Section 7.5 and Table 7.4
10632(a)(7)	Provide an analysis of the impacts of each of the actions and conditions in the water shortage contingency analysis on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts.	Water Shortage Contingency Planning	Section 8.6	Section 7.8 and Tables 7.6 and 7.7
10632(a)(8)	Provide a draft water shortage contingency resolution or ordinance.	Water Shortage Contingency Planning	Section 8.7	Section 7.9 and Appendix H
10632(a)(9)	Indicate a mechanism for determining actual reductions in water use pursuant to the water shortage contingency analysis.	Water Shortage Contingency Planning	Section 8.5	Section 7.7
10631(f)(1)	Retail suppliers shall provide a description of the nature and extent of each demand management measure implemented over the past five years. The description will address specific measures listed in code.	Demand Management Measures	Sections 9.2 and 9.3	Section 8
10631(f)(2)	Wholesale suppliers shall describe specific demand management measures listed in code, their distribution system asset management program, and supplier assistance program.	Demand Management Measures	Sections 9.1 and 9.3	N/A

CWC Section	UWMP requirement	Subject	Guidebook Location	UWMP Section
10631(j)	CUWCC members may submit their 2013- 2014 CUWCC BMP annual reports in lieu of, or in addition to, describing the DMM implementation in their UWMPs. This option is only allowable if the supplier has been found to be in full compliance with the CUWCC MOU.	Demand Management Measures	Section 9.5	N/A
10608.26(a)	Retail suppliers shall conduct a public hearing to discuss adoption, implementation, and economic impact of water use targets.	Plan Adoption, Submittal, and Implementation	Section 10.3	Section 9.3 and Appendix L
10621(b)	Notify, at least 60 days prior to the public hearing, any city or county within which the supplier provides water that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan.	Plan Adoption, Submittal, and Implementation	Section 10.2.1	Sections 1.3.2 and 9.2.2, Table 1.1, and Appendix B
10621(d)	Each urban water supplier shall update and submit its 2015 plan to the department by July 1, 2016.	Plan Adoption, Submittal, and Implementation	Sections 10.3.1 and 10.4	Appendix L
10635(b)	Provide supporting documentation that Water Shortage Contingency Plan has been, or will be, provided to any city or county within which it provides water, no later than 60 days after the submission of the plan to DWR.	Plan Adoption, Submittal, and Implementation	Section 10.4.4	Appendix M
10642	Provide supporting documentation that the urban water supplier made the plan available for public inspection, published notice of the public hearing, and held a public hearing about the plan.	Plan Adoption, Submittal, and Implementation	Sections 10.2.2, 10.3, and 10.5	Appendix B
10642	The water supplier is to provide the time and place of the hearing to any city or county within which the supplier provides water.	Plan Adoption, Submittal, and Implementation	Sections 10.2.1	Section 1.3.2 and Appendix B
10642	Provide supporting documentation that the plan has been adopted as prepared or modified.	Plan Adoption, Submittal, and Implementation	Section 10.3.1	Appendix L
10644(a)	Provide supporting documentation that the urban water supplier has submitted this UWMP to the California State Library.	Plan Adoption, Submittal, and Implementation	Section 10.4.3	Appendix M

CWC Section	UWMP requirement	Subject	Guidebook Location	UWMP Section
10644(a)(1)	Provide supporting documentation that the urban water supplier has submitted this UWMP to any city or county within which the supplier provides water no later than 30 days after adoption.	Plan Adoption, Submittal, and Implementation	Section 10.4.4	Appendix M
10644(a)(2)	The plan, or amendments to the plan, submitted to the department shall be submitted electronically.	Plan Adoption, Submittal, and Implementation	Sections 10.4.1 and 10.4.2	Appendix M
10645	Provide supporting documentation that, not later than 30 days after filing a copy of its plan with the department, the supplier has or will make the plan available for public review during normal business hours.	Plan Adoption, Submittal, and Implementation	Section 10.5	Appendix M



**APPENDIX B:
PUBLIC OUTREACH DOCUMENTATION**



VALLEY OF THE MOON WATER DISTRICT

A Public Agency Established in 1962

19039 Bay Street · P.O. Box 280

El Verano, CA 95433-0280

Phone: (707) 996-1037

Fax: (707) 996-7615

Attention: Sonoma Index-Tribune
Public Notice Advertisement

From: Jennifer Yankovich, Administration and Finance Manager
Valley of the Moon Water District
(707) 996-1037

RE: Notice of Public Hearing for Publication in
February 23, 2016 Sonoma Index-Tribune Issue

Notice of Preparation of Urban Water Management Plan - 2015 Update

The Urban Water Management Planning Act (California Water Code §10608–10656) requires the Valley of the Moon Water District (“District”) to update its Urban Water Management Plan (“UWMP”) every 5 years. The District is currently reviewing its 2010 UWMP, and considering revisions to the document. The updated 2015 UWMP is due by July 1, 2016. We invite public participation in this revision process.

A draft of the 2015 UWMP will be made available for public review and a public hearing will be scheduled later this year. For more information regarding the District’s 2010 UWMP and the schedule for preparing the 2015 UWMP, or if you would like to participate in the preparation of the 2015 UWMP, please contact Daniel Muelrath at: Valley of the Moon Water District 19039 Bay Street, P.O. Box 280 El Verano, CA 95433 Phone: (707) 996-1037 Fax: (707) 996-7615 dmuelrath@vomwd.com

Please submit invoice to: Valley of Moon Water District
Attn: Accounts Payable
PO Box 280
El Verano, CA 95433



VALLEY OF THE MOON WATER DISTRICT

A Public Agency Established in 1962
19039 Bay Street · P.O. Box 280
El Verano, CA 95433-0280
Phone: (707) 996-1037
Fax: (707) 996-7615

January 21, 2016

Valley of the Moon Water District
19039 Bay Street
P.O. Box 280
El Verano, CA 95433

Re: Notice of Preparation of Urban Water Management Plan - 2015 Update

The Urban Water Management Planning Act (California Water Code §10608–10656) requires the Valley of the Moon Water District (“District”) to update its Urban Water Management Plan (“UWMP”) every 5 years. The District is currently reviewing its 2010 UWMP, and considering revisions to the document. The updated 2015 UWMP is due by July 1, 2016. We invite your agency’s participation in this revision process.

A draft of the 2015 UWMP will be made available for public review and a public hearing will be scheduled later this year. In the meantime, if you would like more information regarding the District’s 2010 UWMP and the schedule for preparing the 2015 UWMP, or if you would like to participate in the preparation of the 2015 UWMP, please contact Daniel Muelrath at:

Valley of the Moon Water District
19039 Bay Street, P.O. Box 280
El Verano, CA 95433
Phone: (707) 996-1037
Fax: (707) 996-7615
dmuelrath@vomwd.com

Sincerely,

A handwritten signature in cursive script that reads "Daniel Muelrath".

Daniel Muelrath
General Manager

From: Daniel Muelrath <dmuelrath@vomwd.com>
Sent: Wednesday, May 25, 2016 10:56 AM
To: Daniel Muelrath
Subject: VOMWD - UWMP Notice of Public Hearing

Notice of Public Hearing

Valley of the Moon Water District

Hearing Topics: Draft 2015 Urban Water Management Plan
Date: June 7, 2016, 6:35 pm
Location: Board of Directors Chambers
Valley of the Moon Water District
19039 Bay Street, Sonoma, CA 95476

The Board of Directors of the Valley of the Moon Water District will hold a public hearing on June 7, 2016 at 6:35 p.m. to receive comments on the draft 2010 Urban Water Management Plan (Plan). The purpose of the Plan is to consolidate information regarding water supply and demand, provide public information, and improve statewide water planning. The Plan may be reviewed at the following locations:

Valley of the Moon Water District Office, 19039 Bay Street, Sonoma, CA 95476

Valley of the Moon Water District's web page at <http://www.vomwd.com>

Oral and written testimony will be taken at the hearing. Written comments may also be submitted to the General Manager of the Valley of the Moon Water District, P.O. Box 280, El Verano, CA 95433, for receipt prior to the hearing.

Sonoma Index-Tribune

<http://www.vomwd.com>

www.sonomacountyhistory.org

**FICTITIOUS
BUSINESS NAME STATEMENT
FILE NO. 2016-01906**

Hybrid Prefab Homes located at 6715 Fairfield Drive, Santa Rosa CA 95409 Sonoma County, is hereby registered by the following owner(s): Otis Orsburn, 6715 Fairfield Drive, Santa Rosa, CA 95409

This business is conducted by: An Individual

The registrant commenced to transact business under the fictitious name or names above on N/A.

I declare that all information in this statement is true and correct. Signed: Otis Orsburn - Owner

This statement was filed with the County Clerk of SONOMA COUNTY on 5/17/2016

I hereby certify that this copy is a correct copy of the original statement on file in my office.

WILLIAM F. ROUSSEAU

Sonoma County Clerk

By /s/ Alma Roman

Deputy Clerk

SEAL

2741810 - Pub. May 24, 31; Jun 7, 14, 2016 4ti.

**FICTITIOUS
BUSINESS NAME STATEMENT
FILE NO. 2016-01324**

GOSSELIN & ASSOCIATES located at 1128 Lance DR, Santa Rosa Ca 95401 Sonoma County, is hereby registered by the following owner(s): KENNETH J GOSSELIN, 1128 Lance DR, Santa Rosa Ca 95401

This business is conducted by: An Individual

The registrant commenced to transact business under the fictitious name or names above on 3/16/91.

I declare that all information in this statement is true and correct. Signed: KENNETH J GOSSELIN

This statement was filed with the County Clerk of SONOMA COUNTY on 4/4/2016

I hereby certify that this copy is a correct copy of the original statement on file in my office.

WILLIAM F. ROUSSEAU

Notice of Public Hearing

Valley of the Moon Water District

Hearing Topics:

Draft 2015 Urban

Water Management Plan

Date:

June 7, 2016, 6:35 pm

Location:

Board of Directors Chambers

Valley of the Moon Water

District

19039 Bay Street,

Sonoma, CA 95476

The Board of Directors of the Valley of the Moon Water District will hold a public hearing on June 7, 2016 at 6:35 p.m. to receive comments on the draft 2015 Urban Water Management Plan (Plan) and to readopt its urban water use target. The purpose of the Plan is to consolidate information regarding water supply and demand, provide public information, and improve state-wide water planning. In Conjunction with the update to the Plan, the community must be given an opportunity to give input on the District's method of determining its urban water use target, the District's implementation plan for meeting said target, and any impacts to the local economy resulting from this implementation plan. The Plan may be reviewed at the following locations:

Valley of the Moon Water District Office, 19039 Bay Street, Sonoma, CA 95476

Valley of the Moon Water District's web page at <http://www.vomwd.com>

Oral and written testimony will be taken at the hearing. Written comments may also be submitted to the General Manager of the Valley of the Moon Water District, P.O. Box 280, El Verano, CA 95433, for receipt prior to the hearing.

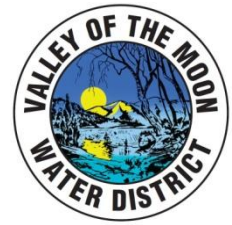
2739767 - Pub. May 24, 27, 2016 2ti

**FICTITIOUS
BUSINESS NAME STATEMENT
FILE NO. 2016-01935**

1) Wine Country Hosts; 2) Amuze located at 4444 Lowell Valley Loop Rd



**APPENDIX C:
WATER DEMAND ANALYSIS AND WATER CONSERVATION MEASURES REPORT**



Valley of the Moon Water District

2015 Urban Water Management Plan Water Demand Analysis and Water Conservation Measures Update

FINAL

July 1, 2015



*MADDAUS
WATER
MANAGEMENT INC.*

TABLE OF CONTENTS

LIST OF FIGURES	4
LIST OF TABLES	4
LIST OF ACRONYMS	5
EXECUTIVE SUMMARY	6
Introduction	6
Long-Term Demand and Conservation Program Analysis Results	6
1. INTRODUCTION	12
1.1 Goals and Objectives	12
1.2 Approach and Methodology	12
1.3 Collaboration between SMSWP, Water Contractors and SCWA	13
1.4 Content of Report	13
2. DATA COLLECTION AND VERIFICATION PROCESS	14
2.1 Data Collection Process	14
2.2 Types of Data Collected	14
3. DEMAND PROJECTIONS	17
3.1 Demand Methodology Overview	17
3.2 Future Population and Employment Projections	19
3.3 Water Use Data Analysis and Key Inputs to the DSS Model	20
3.4 Water Use Targets	23
3.5 Water Demand Projections With and Without the Plumbing Code	24
3.6 Water Demand Projections – 2015 Urban Water Management Plan (UWMP) Format	25
4. COMPARISON OF INDIVIDUAL CONSERVATION MEASURES	27
4.1 Selecting Conservation Measures to be Evaluated (Conservation Measure Screening)	27
4.2 Conservation Measures Evaluated	27
4.3 Water Reduction Methodology	31
4.4 Perspectives on Benefits and Costs	31
4.5 Present Value Parameters	31
4.6 Measure Assumptions including Unit Costs and Water Savings	32
4.7 Assumptions about Avoided Costs	32
4.8 Comparison of Individual Measures	34
5. RESULTS OF CONSERVATION PROGRAM EVALUATION	38
5.1 Selection of Measures for Programs	38
5.2 Results of Program Evaluation	39
6. CONCLUSIONS	44
APPENDIX A - ASSUMPTIONS FOR THE DSS MODEL	45
A.1 Plumbing Codes and Legislation	45
A.2 Present Value Parameters	55
A.3 Assumptions about Measure Costs	55
A.4 Assumptions about Measure Savings	56

APPENDIX B - WATER USE GRAPHS FOR PRODUCTION AND CUSTOMER CATEGORIES	57
APPENDIX C - MEASURE SCREENING PROCESS AND RESULTS	64
APPENDIX D - ASSUMPTIONS FOR WATER CONSERVATION MEASURES EVALUATED IN THE DSS MODEL	68
APPENDIX E - LIST OF CONTACTS.....	93
APPENDIX F - REFERENCES.....	95

LIST OF FIGURES

Figure ES-1. Conservation Measure Program Scenarios.....	8
Figure ES-2. Long Term Demands with Conservation Programs*	9
Figure ES-3. Water Conservation Program Savings Projections – SB X7-7 Target, GPCD.....	11
Figure 3-1. DSS Model Flow Diagram.....	18
Figure 3-2. Historical and Projected Population and Employment.....	19
Figure 3-3. Potable Water Use Projections for Valley of the Moon Water District (AFY).....	24
Figure 5-1. Conservation Measures Selected for Programs.....	39
Figure 5-2. Long Term Demands with Conservation Programs.....	40
Figure 5-3. Present Value of Utility Costs versus Cumulative Water Saved.....	41
Figure 5-4. Water Conservation Program Savings Projections – SB X7-7 Target, GPCD	43
Figure A-1. DSS Model Overview Used to Make Potable Water Demand Projections.....	49
Figure A-2. Example Toilet Replacement Percentages by Type of Toilet	50
Figure A-3. Example Residential Toilet Initial Proportions from Fixture Analysis used for DSS Fixture Model	51
Figure A-4. Example Residential Toilet Fixture Screenshot from DSS Model	52
Figure A-5. Example Future Replacement Rates of Fixtures from DSS Model	53
Figure A-6. End Use Breakdown Example Screenshot.....	54
Figure A-7. Single Family End Use Breakdown and Fixture Use Frequency Example Screenshot	54
Figure C-1. Water Contractor-Only Measures Screening Ranking.....	65
Figure C-2. Regional Measures Screening Ranking.....	66

LIST OF TABLES

Table ES-1 Conservation Measures Evaluated.....	7
Table ES-2. Potable Water Use Projections (Acre-Feet/Year)*	8
Table ES-3. Water Demand Program Savings Projections	10
Table ES-4. Water Conservation Program Savings Projections - SB X7-7 Target GPCD.....	10
Table ES-5. Economic Analysis of Alternative Programs	11
Table 2-1. Data Collected for Water Contractors.....	15
Table 3-1. Historical and Projected Population and Employment.....	20
Table 3-2. Water Use Data Analysis and DSS Model Key Assumptions.....	22
Table 3-3. Potable Water Use Projections (Acre-Feet/Year)*.....	24
Table 3-4. (DWR Table 2-2) Population – Current and Projected	25
Table 3-5. Demands and Accounts by Customer Category*	25
Table 3-6. (DWR Table 3-1) Retail Uses of Potable and Raw Water - Actual and Projected (Acre-Feet/Year)	26
Table 3-7. (DWR Table 3-4) Losses from Potable Water System (Acre-Feet/Year)*	26
Table 3-8. (DWR Table 3-6) Total Potable Water Use (Acre-Feet/Year)*	26
Table 3-9. (DWR Table 3-8) Passive Savings (Acre-Feet/Year)*	26
Table 4-1. Water Use Efficiency Measure Descriptions.....	28
Table 4-2. Water Contractor Avoided Costs of Water.....	33
Table 4-3. Conservation Measure Cost and Savings	36
Table 5-1. Potable Water Use Projections (Acre-Feet/Year)*.....	40
Table 5-2. Long Term Conservation Program Savings.....	41
Table 5-3. Comparison of Long-Term Conservation Programs – Utility Costs and Savings	42
Table 5-4. Water Conservation Program Savings Projections - SB X7-7 Target GPCD	42
Table 6-1. Potable Water Use Projections (Acre-Feet/Year)*	44
Table A-1. CALGreen Building Code Summary Table.....	46
Table A-2. New Development Ordinances	47

LIST OF ACRONYMS

AB	Assembly Bill	IRR	Irrigation
ABAG	Association of Bay Area Governments	MF	Multi-family
ACS	American Community Survey	MG	Million gallons
AF	acre-foot/acre-feet	MMDD	Master measure design database
AFY	acre-foot/acre-feet per year	MMWD	Marin Municipal Water District
AMI	Automated Meter Infrastructure	MWM	Maddaus Water Management, Inc.
AWWA	American Water Works Association	ND	New Development
AWWARF	American Water Works Association Research Foundation	NMWD	North Marin Water District
BMP	Best Management Practice	NRW	Non-revenue water
CCR	California Code of Regulations	PV	Present value
CII	Commercial, Industrial, and Institutional	PWSS	Public Water System Statistics
CPI	Consumer Price Index	SB	Senate Bill
CUWCC	California Urban Water Conservation Council	SCWA	Sonoma County Water Agency
DWR	Department of Water Resources	SF	Single Family
DSS	Decision Support System	SMSWP	Sonoma-Marín Saving Water Partnership
FY	Fiscal Year	UHET	Ultra High Efficiency Toilet
GPCD	Gallons per capita per day	ULFT	Ultra Low Flow Toilet
gpf	Gallons per flush	UWMP	Urban Water Management Plan
HE	High Efficiency	VOMWD	Valley of the Moon Water District
HEU	High Efficiency Urinal	WF	Water factor
ILI	Infrastructure Leakage Index	WSA	Water Supply Assessment

EXECUTIVE SUMMARY

Introduction

To prepare for the submission of the 2015 Urban Water Management Plan, a demand and conservation technical analysis was conducted by Maddaus Water Management, Inc. (MWM) for Valley of the Moon Water District (VOMWD). The primary purpose of this analysis was to:

1. Calculate a demand forecast for the years 2015 to 2040.
2. Calculate the range of conservation costs and savings for the years 2015 to 2040. This effort included:
 - Evaluating twenty-five existing and new conservation programs that can possibly reduce future water demand.
 - Estimating the costs and water savings of these measures.
 - Combining the measures into increasingly more aggressive programs and evaluating the costs and water savings of these programs.

Long-Term Demand and Conservation Program Analysis Results

The MWM project included analysis for all the Sonoma and Marin County Water Contractors receiving Russian River Water Supply from Sonoma County Water Agency and consisted of two main parts: (1) create a demand and conservation analysis for 2015 to 2040, and (2) evaluate conservation savings potential for the years 2015 to 2040 with a variety of different measures and conservation programs.

The first step in the analysis was to review and analyze historical water use production and billing data. Building on MWM's previous year 2010 demand and conservation technical analysis effort, for most Water Contractors, billing data was provided for the years 2010 to 2014. The data was graphically analyzed and discussed with the individual Water Contractors.

The historical water use, the selected population and employment projections, the plumbing code information, and discussions with the Water Contractors were used to create a demand forecast for the years 2015 to 2040, as further described in Section 3.

Once the demands were completed, the conservation measures were analyzed for a total of 25 measures shown in Table ES-1. The conservation analysis included all the measures selected by the Sonoma-Marin Water Contractors via electronic survey. The following important assumptions about the conservation measures were included in this analysis:

1. The measures reviewed for each Water Contractor is listed in the following table and described in Section 4.
2. New development ordinances were updated to reflect new local ordinances, the Model Water Efficient Landscape Ordinance, and the CALGreen building code (as of May 1, 2015). This can be found in Appendix A.

The following tables and figures present the water demands and conservation savings for this analysis. The Plumbing Code includes the new California State Law (Assembly Bill 715), which requires High Efficiency Toilets and High Efficiency Urinals as of 2014. The Plumbing Code also includes SB 407, which applies to all new construction and replacements as of 2017 for single family and 2019 for multi-family and commercial properties. The increase of projected growth in population and/or jobs will cause water demand to increase. For each Water Contractor the three conservation Program scenarios are organized as follows:

- **Program A:** "Existing Program" option includes the measures that the Water Contractor currently offers. These measures are not necessarily designed the way they are currently implemented, having, in some cases, more aggressive annual account targets planned for the future.
- **Program B:** "Optimized Program" represents measures that are either a code requirement or CUWCC-required option for conservation. This program essentially represents the minimum conservation action required for

compliance. These measures are not necessarily designed the way they are currently implemented, having, in some cases, more aggressive annual account targets.

- **Program C:** “All Measures Analyzed” presents a scenario where all 25 measures are implemented.

Table ES-1 presents the conservation measures modeled in this analysis sorted by utility, CII, landscape, and residential category.

Table ES-1 Conservation Measures Evaluated

Utility Measures	CII Measures	Landscape Measures	Residential Measures
Water Loss	Indoor and Outdoor Surveys - CII	Outdoor Large Landscape Audits & Water Budgeting/Monitoring	HE Faucet Aerator / Showerhead Giveaway - SF, MF
AMI	Replace CII Inefficient Equipment	Landscape Rebates and Incentives for Equipment Upgrade	Indoor and Outdoor Surveys - SF, MF
Pricing	Efficient Toilet Replacement Program - CII	Turf Removal - MF, CII	Efficient Toilet Replacement Program – SF
Public Info & School Education - SMSWP	Urinal Rebates – CII	Turf Removal - SF	Direct Install UHET, Showerheads, and Faucet Aerators - SF, MF
Public Info & School Education - Water Contractor	Plumber Initiated UHET & HEU Retrofit Program	Water Conserving Landscape and Irrigation Codes	HE Clothes Washer Rebate - SF, MF
Prohibit Water Waste	Require <0.25 gal/flush Urinals in New Development	Require Smart Irrigation Controllers and Rain Sensors in New Development	Submeters Incentive
	HE Faucet Aerator / Showerhead Giveaway – CII		

Sonoma Marin Saving Water Partnership (SMSWP) program includes all Sonoma and Marin County Water Contractors receiving water from Sonoma County Water Agency (SCWA). The conservation programs implemented in 2015 do vary among the individual Water Contractors.

Figure ES-1 presents the collective Water Contractors’ conservation measure program scenarios, indicating which measures have been selected by VOMWD for implementation within each program.

Figure ES-1. Conservation Measure Program Scenarios

Program Scenarios				
 Program Scenarios	Measures	Program A	Program B	Program C
	Water Loss	✓	✓	✓
	AMI	✓	✓	✓
	Pricing	✓	✓	✓
	Public Info & School Education - SMWSP	✓	✓	✓
	Public Info & School Education - Water Contractor	✓	✓	✓
	Prohibit Water Waste	✓	✓	✓
	Indoor and Outdoor Surveys - CII	✓	✓	✓
	Replace CII Inefficient Equipment	✓	✓	✓
	Efficient Toilet Replacement Program - CII	✓	✓	✓
	Urinal Rebates – CII	✓	✓	✓
	Plumber Initiated UHET & HEU Retrofit Program	✓	✓	✓
	Require <0.25 gal/flush Urinals in New Development	✓	✓	✓
	HE Faucet Aerator / Showerhead Giveaway – CII	✓	✓	✓
	HE Faucet Aerator / Showerhead Giveaway - SF, MF	✓	✓	✓
	Indoor and Outdoor Surveys - SF, MF	✓	✓	✓
	Efficient Toilet Replacement Program – SF	✓	✓	✓
	Direct Install UHET, Showerheads, and Faucet Aerators - SF, MF	✓	✓	✓
	HE Clothes Washer Rebate - SF, MF	✓	✓	✓
	Submeters Incentive	✓	✓	✓
	Outdoor Large Landscape Audits & Water Budgeting/Monitoring	✓	✓	✓
	Landscape Rebates and Incentives for Equipment Upgrade	✓	✓	✓
	Turf Removal - MF, CII	✓	✓	✓
	Turf Removal - SF	✓	✓	✓
	Water Conserving Landscape and Irrigation Codes	✓	✓	✓
	Require Smart Irrigation Controllers and Rain Sensors in New Development	✓	✓	✓

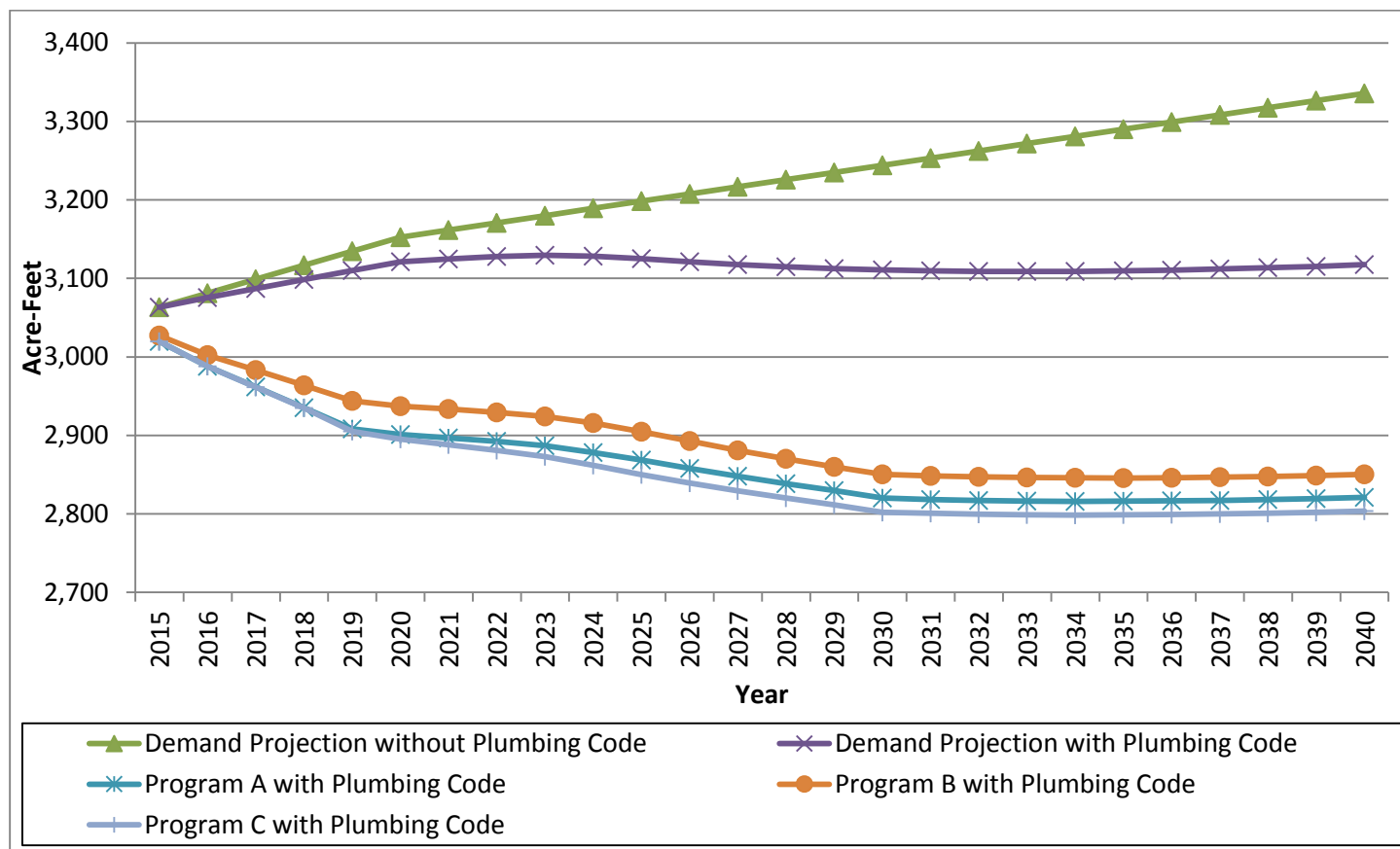
The following table presents VOMWD's potable water use projections without plumbing code savings, with only plumbing code savings and no active conservation activity, and with plumbing code savings and Program A, Program B, and Program C active conservation program implementation savings.

Table ES-2. Potable Water Use Projections (Acre-Feet/Year)*

	2015	2020	2025	2030	2035	2040
Demand without Plumbing Code (AFY)	3,063	3,152	3,198	3,244	3,290	3,336
Demand with Plumbing Code (AFY)	3,063	3,121	3,125	3,111	3,110	3,117
Demand with Plumbing Code and Program A	3,020	2,901	2,869	2,820	2,816	2,821
Demand with Plumbing Code and Program B	3,027	2,937	2,905	2,850	2,846	2,850
Demand with Plumbing Code and Program C	3,020	2,895	2,850	2,802	2,799	2,804

*Data is not weather normalized. Total water use is potable only. Does not include recycled water use. Recycled water use and projection are in a separate section in the UWMP.

Figure ES-2 exhibits VOMWD's long term demands without plumbing code savings, with only plumbing code savings and no active conservation activity, and with plumbing code savings and Program A, Program B, and Program C active conservation program implementation savings.

Figure ES-2. Long Term Demands with Conservation Programs*

Note: All line types shown in the legend are presented in the graph. The following demand scenarios, Program A, Program B, and Program C, are close in value and therefore may be indistinguishable in the figure.

The following table shows the annual water savings for plumbing codes only as well as plumbing codes with Program A, Program B, and Program C active conservation program implementation in five-year increments.

The benefit to cost ratio for each conservation program from the perspective of the Water Contractor (water utility) and the perspective of the Water Contractors and customers (community) is also presented.

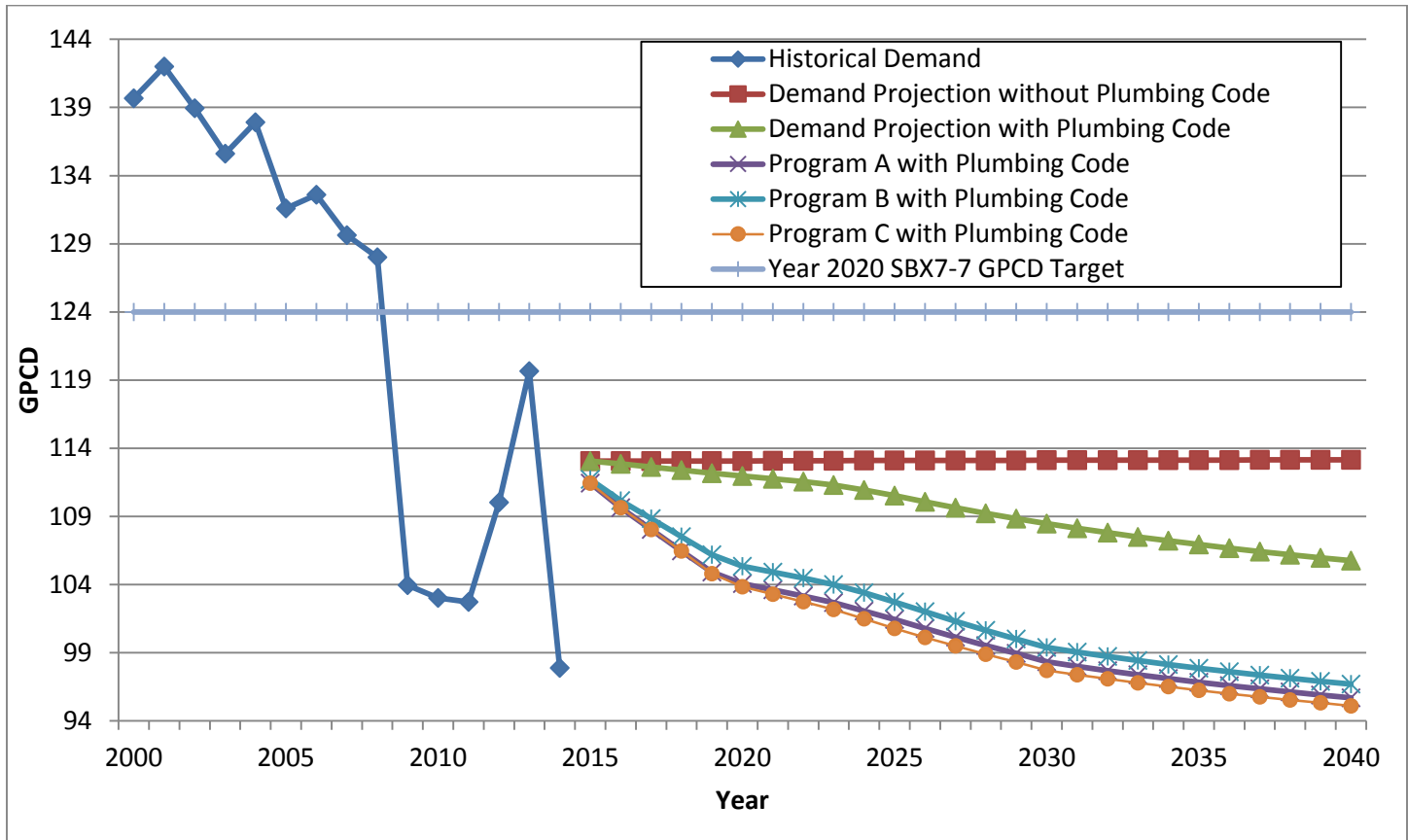
Table ES-3. Water Demand Program Savings Projections

Conservation Program Water Savings (AFY)	2015	2020	2025	2030	2035	2040	Water Utility Benefit to Cost Ratio	Community Benefit to Cost Ratio
Plumbing Code	-	31	73	133	180	218	N/A	N/A
Program A with Plumbing Code	43	251	330	424	474	515	1.50	1.05
Program B with Plumbing Code	36	215	294	394	444	485	1.71	1.59
Program C with Plumbing Code	43	257	348	442	491	532	1.45	1.06

Table ES-4 and Figure ES-3 present the SB X7-7 target GPCD and year as well as projected GPCD demand estimates with plumbing codes alone, and with plumbing codes with Program A, Program B, and Program C for VOMWD.

Table ES-4. Water Conservation Program Savings Projections - SB X7-7 Target GPCD

GPCD Target Source	SB X7-7
GPCD Goal	124
GPCD Goal Year	2020
GPCD with Plumbing Code in 2020	112
GPCD Program A with Plumbing Code in 2020	104.1
GPCD Program B with Plumbing Code in 2020	105.4
GPCD Program C with Plumbing Code in 2020	103.8

Figure ES-3. Water Conservation Program Savings Projections – SB X7-7 Target, GPCD**Notes:**

1. All line types shown in the legend are presented in the graph. The following demand scenarios, Program A, Program B, and Program C, are close in value and therefore may be indistinguishable in the figure.
2. Note the decline in water use in the 2014 dry year and 2008-2011 economic recession.

The following table shows the year 2040 indoor and outdoor water savings for the three conservation programs modeled; the present value of water savings and the present value of costs to the utility and community are also displayed. The cost of utility savings per unit volume of water is shown in the far-right column.

Table ES-5. Economic Analysis of Alternative Programs

	2040 Indoor Water Savings (AFY)	2040 Outdoor Water Savings (AFY)	2040 Total Water Savings (AFY)	Present Value of Water Savings (\$)	Present Value of Utility Costs (\$)	Present Value of Community Costs (\$)	Cost of Utility Savings per Unit Volume (\$/AF)
Program A with Plumbing Code	262	252	514	\$6,336,800	\$4,237,006	\$6,786,677	\$665
Program B with Plumbing code	248	237	485	\$5,522,864	\$3,225,797	\$3,777,536	\$577
Program C with Plumbing Code	279	253	532	\$6,664,041	\$4,605,222	\$7,254,882	\$685

1. INTRODUCTION

The Valley of the Moon Water District has a current water conservation program. This report evaluates whether expanding existing conservation efforts is a cost-effective way to meet future water needs.

In this report demand management and water conservation are used interchangeably. The evaluation includes measures directed at existing accounts as well as new development measures that mandate that new residential and business customers become more water efficient. Three program scenarios were provided to help evaluate the net effect of running multiple measures together over time. Assumptions and results for each of the 25 individual measures and three programs will be described in detail in this report.

1.1 Goals and Objectives

The purpose of this report is to present an overview of the demand and conservation evaluation process which has been completed for the Valley of the Moon Water District (VOMWD or Water Contractor). The goal was to develop forecasts of demand and conservation savings for the 2015 Urban Water Management Plan. The local water utility retail Water Contractors of the Sonoma-Marín Saving Water Partnership (SMSWP) including City of Cotati, Marin Municipal Water District (MMWD), North Marin Water District, City of Petaluma, City of Rohnert Park, City of Santa Rosa, City of Sonoma, Valley of the Moon Water District, and Town of Windsor, collectively known as the Water Contractors, worked together to prepare a Water Demand Analysis and Water Conservation Measures Report (Project).

This Project included the development of transparent, defensible, and uniform demand and conservation projections for the nine Sonoma-Marín Saving Water Partnership (SMSWP) Water Contractors, using a common methodology that can be used to support regional planning efforts as well as individual contractor work. Pursuant to this goal, the specific objectives of the Project were as follows:

- (1) Quantify the total average-year water demand for each SMSWP Water Contractor to the year 2040;
- (2) Quantify the passive and active conservation water savings potential for each individual SMSWP Water Contractor through 2040;
- (3) Identify conservation programs for further consideration for regional implementation by SMSWP; and
- (4) Provide each SMSWP Water Contractor with a user-friendly model that can be used to support ongoing demand and conservation planning efforts.

1.2 Approach and Methodology

To accomplish the above goal and objectives, each Water Contractor's water demands and conservation savings was forecasted through 2040 using the Demand Side Management Least Cost Planning Decision Support System (DSS Model). The DSS Model prepares long-range, detailed water demand and conservation savings projections to enable a more accurate assessment of the impact of water efficiency programs on demand. The DSS Model can use either a statistical approach to forecast demands (e.g., an econometric model), or it can use forecasted increases in population and employment to evaluate future demands. Furthermore, the DSS Model evaluates conservation measures using benefit cost analysis with the present value of the cost of water saved and benefit-to-cost ratio as economic indicators. The analysis is performed from various perspectives including the utility and community. The DSS Model was also used to forecast demands for the Water Contractors in prior planning efforts in 2005 and 2009 (except the City of Petaluma in 2009).

1.3 Collaboration between SMSWP, Water Contractors and SCWA

This report was completed as a collaborative effort between the staff of the SMSWP Water Contractors and the consulting team from Maddaus Water Management, Inc. The Sonoma County Water Agency (SCWA) also provided input on technical items associated with the conservation analysis, given its role as the wholesale water agency to the nine Water Contractors. Over the course of this report's development, input was solicited from the aforementioned groups (Project Team) through multiple forums, including workshops, one-on-one meetings, and web-based meetings.

1.4 Content of Report

This report provides a general overview for the methodology, assumptions, and results for the demand forecast and conservation analysis. The following information is included in this report and is discussed in individual sections below:

- Section 2 - Data Collection and Verification Process
- Section 3 - Demand Projections
- Section 4 - Comparison of Individual Conservation Measures
- Section 5 - Results of Conservation Program Evaluation
- Section 6 - Conclusions
- Appendix A - Assumptions for the DSS Model
- Appendix B - Water Use Graphs for Production and Customer Categories
- Appendix C - Measure Screening Process and Results
- Appendix D - Assumptions for Water Conservation Measures Evaluated in the DSS Model
- Appendix E – List of Contacts
- Appendix F – References

2. DATA COLLECTION AND VERIFICATION PROCESS

This section presents an overview of the long term demand and conservation evaluation process including the initial data collection steps.

2.1 Data Collection Process

The initial phase of this effort included a data collection process using a Data Collection and Verification File (Data File). The quantitative Data File was developed in Microsoft Excel to collect, organize, and verify the necessary input data for the DSS Model. The data required for the demand and conservation projections was organized into the Data Files (one per Water Contractor). This task was streamlined by populating the Data File using a variety of existing data sources based on previous project collaborations and readily available information prior to distributing the files to the individual Water Contractors. Each Water Contractor was then asked to verify that the information in the Data File was accurate and update any missing information. A key source for existing data was the CUWCC database, the Sonoma-Marín Saving Water Partnership Conservation Reports and SCWA Rates for Water Deliveries annual reports, which capture much of the required data. Other significant data sources included 2010 UWMPs, Department of Water Resources Public Water System Statistics (DWR PWSS) Reports and the 2013 Association of Bay Area Governments (ABAG) Projections (population and employment forecasts).

The Data File was completed and verified by the member Water Contractors through the following steps:

- (1) **Distribution of Files to Individual Water Contractors:** The files were distributed to the individual Water Contractors in January 2015 via the Project's ftp site.
- (2) **Instructional Meetings:** A kick off meeting with the Water Contractors was held on January 21, 2015 to disseminate information related to the data collection process. During the meeting, the Project Team reviewed the Data File contents with the Water Contractors and provided instructions for completing the files.
- (3) **Data File Completion by Water Contractors:** Each Water Contractor reviewed and completed its individual Data File, which required:
 - Verification of the data that was pre-populated in the file by the Project Team
 - Data entry of missing information into the Data File as needed
- (4) **Data File Submission by Water Contractors:** Water Contractors submitted the files via the Project ftp site between the end of February and early March 2015 after completing Step 3.
- (5) **Data File Review and Refinement:** The Project Team reviewed the individual data files in the order submitted. If further data and refinement were required, the Project Team contacted the individual Water Contractor to obtain the necessary information.
- (6) **Data Signature Forms:** Once the data was submitted by each Water Contractor and deemed to be complete, the Water Contractor signed a data verification form to acknowledge the data was ready for the demand analysis portion of the project.

2.2 Types of Data Collected

The data needs of the DSS Model drove the data collection effort. The individual data elements within each category are documented in Table 2-1. Data including water rates and total employment (jobs) were collected to evaluate the historical growth and future growth in the service area. The service area data was used for both of the demand forecasting tools in the DSS Model and for the conservation analysis.

Service area demographic data such as the number of dwelling units were collected from the 2010 U.S. Census data and 2011-2013 American Community Survey (ACS) 3-Year Estimates. Population sources include the 2010 UWMPs, the 2013

ABAG Projections (population and employment forecasts), SMSWP conservation reports, prior DSS Models, and Water Contractor provided projections. The service area demographics were used for future demand forecasting.

Historical conservation data from the SMSWP and CUWCC conservation activity databases was incorporated into the Project for a review of future conservation program levels of saturation and as a benchmark of reasonable levels of implementation for future conservation programs.

Table 2-1. Data Collected for Water Contractors

Model Input Parameter	Time Period	Units	Source(s)
Service Area Data			
Agency Info	Current	NA	Water Contractor Provided
Contact Info	Current	Name, number, email	Water Contractor Provided
Planning Documents	Varies	NA	2010 UWMP Water Contractor Provided
Abnormal Years	Varies	Years	Water Contractor Provided
Customer Classes	Varies	NA	Water Contractor Provided
System Input Volume (Water Production)	1997-2014 or longer if provided	Volume	Previous DSS Models SMSWP & CUWCC Conservation Database 2010 UWMPs DWR PWSS Reports
Consumption and Accounts	1997-2014 or longer if provided	Volume	
Cost of Water	Varies	\$ / Volume	
Maximum Day Demand	Varies	Date & Volume	Water Contractor provided
Water System Audits	2010 to 2014 if available	NA	Water Contractor Provided American Water Works Association (AWWA) Methodology
Service Area Demographics			
Historical Service Area Population	2000-2014	People	Water Contractor Provided
Projected Population	2015-2040	People	ABAG 2013 2010 UWMP Prior DSS Models Water Contractor Provided
DP-1 General Profile and Housing Characteristics	2010	Various units	2010 US Census 2013 ACS 3-yr
DP04 Selected Housing Characteristics	2010	Various units	2010 US Census 2013 ACS 3-yr
B25033 Population in Housing Units	2010	Dwelling units	2010 US Census 2013 ACS 3-yr
Economy			
Historical Service Area Employment	2000-2014	Jobs	ABAG 2013 2010 UWMP Prior DSS Models Water Contractor Provided
Projected Jobs	2015-2040	Jobs	ABAG 2013 DSS Models Water Contractor Provided

Conservation			
Historical Conservation	Program Inception to 2014	Various units	SMSWP and CUWCC Database Prior DSS Models Water Contractor Provided
Conservation Targets	2018, 2020 or other	GPCD	SMSWP and CUWCC Database Water Contractor Provided

3. DEMAND PROJECTIONS

The purpose of Section 3 is to document the demand projections developed for the Project. This section presents:

- Demand methodology overview,
- Population and employment projections,
- Water use data analysis inputs and key assumptions for the DSS Model,
- Water use targets
- Water demand projections with and without the plumbing code savings through 2040 (this is the demand before incorporating planned water savings from future active conservation efforts), and
- Water demand projections in the 2010 Urban Water Management Plan (UWMP) format in preparation for the 2015 UWMP

3.1 Demand Methodology Overview

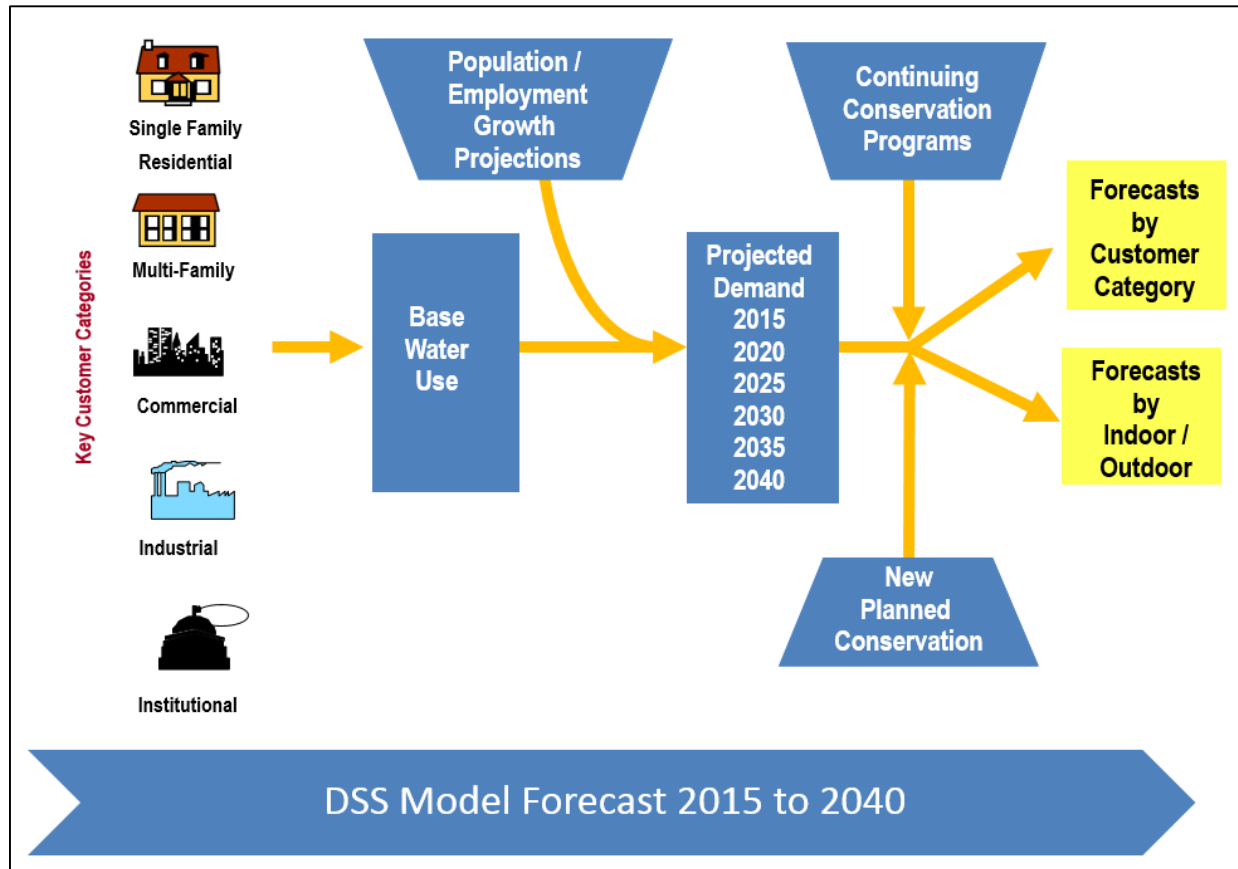
Each Water Contractor's water demand (i.e., average year demand before additional active conservation savings were incorporated) was forecasted through 2040 using the DSS Model. The demand analysis process included forecasting future water demand (2015-2040) by customer category based upon forecasted increases in population and employment. Average water use per customer category account was based on an analysis of historical data between 1990 and 2014 (or a shorter period if a Water Contractor's historical data was incomplete) historical range. To forecast water demands, the DSS Model relies on demographic and employment projections, combined with the effects of natural fixture replacement due to the implementation of plumbing codes to forecast future demands. Natural fixture replacement due to the implementation of plumbing codes is part of passive conservation savings. Passive conservation refers to water savings resulting from actions and activities that do not depend on direct financial assistance or educational programs from Water Contractors. These savings result primarily from (1) the natural replacement of existing plumbing fixtures with water-efficient models required under current plumbing code standards and (2) the installation of water-efficient fixtures and equipment in new buildings and retrofits as required under CALGreen Building Code Standards. The DSS Model evaluated water savings associated with these codes and standards to project passive conservation savings. Section 3 of this report presents the DSS Model's demand estimates taking into account savings only from passive conservation.

3.1.1 DSS Model Methodology

For the demand projections (2015 through 2040), the DSS Model was used to forecast water demand for each Water Contractor. The DSS Model also includes a conservation component that quantifies savings from passive conservation (e.g. plumbing codes) and active conservation programs. The DSS Model's conservation component covers the entire forecast period, 2015-2040. Quantification of water savings potential from active conservation programs is presented in Sections 4 and 5.

The DSS Model prepares long-range, water demand and conservation water savings projections. The DSS Model is an end-use model that breaks down total water production (i.e., water demand in the service area) into specific water end uses, such as toilets, faucets, irrigation, etc. This "bottom-up" approach allows for detailed criteria to be considered when estimating future demands, such as the effects of natural fixture replacement, plumbing codes, and conservation efforts. The purpose of using end use data is to enable a more accurate assessment of the impact of water efficiency programs on demand and to provide a rigorous and defensible modeling approach necessary for projects subject to regulatory or environmental review.

Figure 3-1. DSS Model Flow Diagram



As shown in Figure 3-1, the first step for forecasting water demands using the DSS Model was to gather customer category billing data from each Water Contractor. The next step was to check the model by comparing water use data with available demographic data to characterize water usage for each customer category (single family, multi-family, commercial, industrial, and institutional) in terms of number of users per account and per capita water use. During the model calibration process data were further analyzed to approximate the indoor/outdoor split by customer category. The indoor/outdoor water usage was also further divided into typical end uses for each customer category. Published data on average per-capita indoor water use and average per-capita end use were combined with the number of water users to verify that the volume of water allocated to specific end uses in each customer category is consistent with social norms from end use studies on water use behavior (e.g., for flushes per person per day).

3.1.2 Water Contractor Input and Review

As part of the Project's collaborative approach, an instructional webinar conference call was held in April 2015 to facilitate SMSWP Water Contractor understanding of and involvement in the development of the demand projections. The webinar was attended by the SMSWP Water Contractors. During the webinar, the Project Team reviewed the methodology using a real example with preliminary results from one of the SMSWP Water Contractors. The goal of the webinar was (1) to review the demand modeling approach and results, and (2) to answer Water Contractor questions.

The Water Contractors had the opportunity to review the demand modeling results and to provide questions and comments at the one-on-one calls and emails with the Project Team. In addition, individual in-person meetings were held between MWM modeling staff and Water Contractor representatives to review the draft demand projections in May 2015.

3.2 Future Population and Employment Projections

Each Water Contractor's future population and employment projections were incorporated into each DSS Model to project future demand. The Water Contractor used 2010 census data in their estimation of population for baseline years and the determination of baseline GPCD. Population and employment projections through 2040 were provided or confirmed by each Water Contractor through the data collection process described in Section 2. These growth projections were used to develop a projected demand through the year 2040. Population projections were obtained from one of the following sources:

- Local General Plan (population and employment) – Typically these plans, depending upon when they were published, have a population and jobs forecast for 2040 and build out.
- Association of Bay Area Governments (ABAG) (population and employment) – ABAG recently published a new projections report in 2013 that includes population and employment estimates for each city in the San Francisco Bay Area. The ABAG projections report provides population and employment estimates for 2000, 2005, 2010, 2015, 2020, 2025, 2030, 2035, and 2040. ABAG now publishes its projections report every four years consistent with the Sustainable Community Strategies time line. The previous DSS Model projections and ABAG Projections for 2013 were reviewed to determine the most appropriate data set to use in this DSS Model update.
- Water Supply Assessment (WSA) – No WSAs were provided by any of the Water Contractors for use in this Project but sometimes WSA's can have demographic projections.

At the Water Contractor's request, the population and employment projections were based on the Sonoma County Draft General Plan 2005 estimates to be consistent with the Water Contractor's planning projections. Population and Employment projections are shown in Figure 3-2 and Table 3-1.

Figure 3-2. Historical and Projected Population and Employment

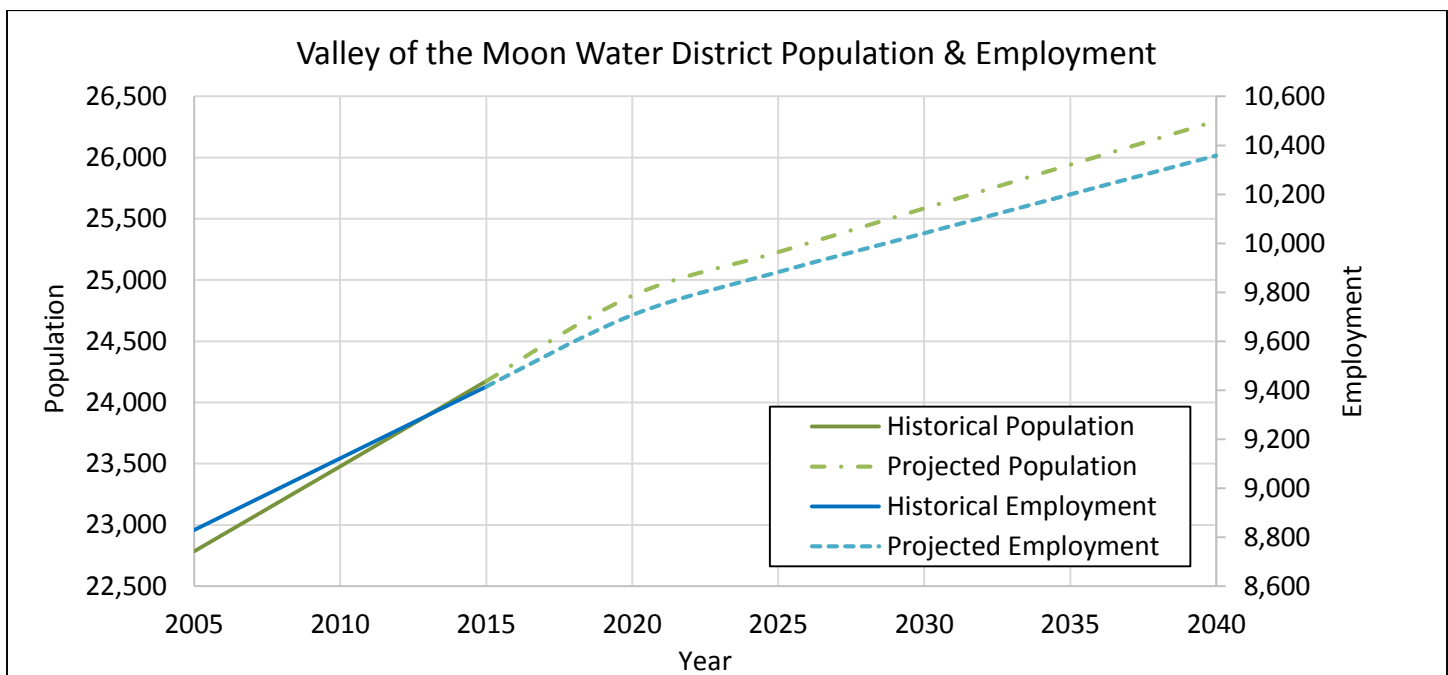


Table 3-1. Historical and Projected Population and Employment

Year	Population	Employment
2005	22,785	8,829
2010	23,478	9,122
2015	24,174	9,415
2020	24,873	9,707
2025	25,229	9,883
2030	25,586	10,041
2035	25,943	10,200
2040	26,300	10,359

Notes:

1. Population projections are based on Sonoma County Draft General Plan 2005 estimates.
2. Employment projections are based on Sonoma County Draft General Plan 2005 estimates.

3.3 Water Use Data Analysis and Key Inputs to the DSS Model

The demand analysis process includes using baseline average water use per customer to forecast water demands by customer category based upon forecasted increases in population and employment to predict customer category account growth. Average water use per customer category account was based on a water use data analysis investigating historical and current water use data and demographic data. This analysis includes the following elements:

- **Model Start Year** – This is the starting year for the analysis. For this project, the start year for the model is 2015. The DSS Model includes 25 years of data projecting information until the year 2040.
- **Base Year for Future Water Factors** – Based on an analysis of historical water billing data, each Water Contractor selected a year or average of multiple years that is representative of current water use and used as a base year demand factor for developing future water use projections. The year (or average of multiple years) was chosen by the Water Contractors for the following reasons:
 - The selected year, or average of years, shows less of an effect from the recession. For many of the Water Contractors, the years 2008 through 2011 show a dip in water demand in many areas due to reduction in economic activity.
 - The year(s) selected had relatively “normal” climate conditions (i.e., not a drought or excessively wet year), so no significant weather adjustments were necessary. For all Water Contractors, the year 2014 was affected by drought conditions. The water billing or production data shown in Appendix B was not weather normalized for this analysis.
 - Many Water Contractors elected to average a few years of data for the analysis. Some Water Contractors selected an individual year as they felt it was representative in terms of weather, vacancy, and customer water use for demand projection purposes.
 - Appendix B presents historical customer category water use graphs. Historical water use was provided by VOMWD, taken from DWR’s annual PWSS reports, or taken from previous modeling efforts conducted by MWM. The data was reviewed and confirmed by VOMWD. Units shown are average gallons of water per account per day. These graphs were reviewed to better identify outlier data points and years so that a representative baseline water use value (of average account water use by category) could be determined. The effects of drought, economic recessions, service line failures, and meter inaccuracies are typically evident in these figures.
- **Average gal/day/acct** – This is the amount of water in gallons that is used per day, per account.
- **Indoor/outdoor Water Use** – This is the amount of water per account split into the percent that is used indoors and outdoors.

- *Non-Revenue Water (NRW)* – This is the sum of all water input to the system that is not billed (metered and unmetered) water consumption, including apparent (metering accuracy) and real losses. The values were calculated by taking the difference between the amount of water produced and the amount of water that was sold. Data provided by the Water Contractor was used, if provided, unless another more accurate value from the AWWA M36 Water Loss reports was provided.
- *Census Data* – The 2010 Census data or 2013 American Community Survey 3-year data was used as a general reference when determining population, housing units and household sizes for each individual city (and/or unincorporated area) serviced by the Water Contractors. Housing units and household sizes were used to estimate water use per person in the service area as well as individual residential customer categories.
- *Current Service Area Population* – The 2015 total population for the Water Contractors was taken directly from the selected population projection source shown in Table 3-1.
- *Procedure for service areas not contiguous with city boundaries* – When a Water Contractor serves an area outside a city boundary, estimates were generated either from census tract data (when available for the unincorporated areas), Department of Finance data, ABAG Projections, Department of Water Resources (DWR) reported data, General Plan data, or by the local Water Contractor if known. If none of these six sources were available, then the Project Team was provided data from the local Water Contractor to make reasonable estimates.
- *Employment data* – The employment figures were obtained from the selected source as discussed earlier in this report.

The following Table 3-2 shows the key inputs and assumptions used in the model. The assumptions having the most dramatic effect on future demands are the natural replacement rate of fixtures, how residential or commercial future use is projected, and finally the percent of estimated non-revenue water. More details on these assumptions, including screenshots of where they are incorporated into the DSS Model, can be found in Appendix A.

Table 3-2. Water Use Data Analysis and DSS Model Key Assumptions

Parameter	Model Input Value, Assumptions, and Key References				
Model Start Year	2015				
Water Demand Factor	2006-2013				
Year(s) [Base Year(s)]	2014 was not used since it was a drought year.				
Non-Revenue Water in Start Year	11.3%				
	This value can be found in the green NRW section of each Water Contractor’s DSS Model.				
Population Projection Source	Sonoma County Draft General Plan 2005				
Employment Projection Source					
Avoided Cost of Water	\$1,485.72/AF (\$4,560/MG). This value can be found in the “Avoided Costs” red section of each Water Contractor’s DSS Model.				
Base Year Water Use Profile (average of years 2006 through 2013)					
Customer Categories	Start Year Accounts	Total Water Use Distribution	Demand Factors (gal/day/acct)	Indoor Use %	Residential Indoor Water Use (gpcd)
Single Family	6,215	68%	264.46	58%	57
Multi-family	437	19%	1,071.30	74%	49
Commercial	167	7%	1,063.79	73%	
Irrigation MF Residential	20	1%	1,505.23	0%	
Irrigation Commercial	12	1%	1,380.28	0%	
Institutional	34	4%	2,642.91	46%	
Total	6,884	100%	N/A	N/A	N/A
Residential End Uses	CA DWR Report "California Single Family Water Use Efficiency Study," 2011, AWWARF Report “Residential End Uses of Water” (DeOreo, 1999, 2015) (2015 AWWARF Report is pending). Water Contractor supplied data on costs and savings, professional judgment where no published data available. Each Water Contractor’s water end use breakdown can be found in the “End Uses” section of their DSS Model on the “Breakdown” worksheet.				
Non-Residential End Uses, %	AWWARF Report "Commercial and Institutional End Uses of Water” (Dziegielewski, 2000). Each Water Contractor’s water end use breakdown can be found in the “End Uses” section of their DSS Model on the “Breakdown” worksheet.				
Efficiency Residential Fixture Current Installation Rates	U.S. Census, Housing age by type of dwelling plus natural replacement plus rebate program (if any). Reference "High Efficiency Plumbing Fixtures - Toilets and Urinals" (Koeller & Company, 2005). Reference Consortium for Efficient Energy (www.cce1.org) This information is included in the “Codes and Standards” green section of each Water Contractor’s DSS Model by customer category fixtures.				
Water Savings for Fixtures, gal/capita/day	AWWARF Report “Residential End Uses of Water” 1999, CA DWR Report "California Single Family Water Use Efficiency Study", 2011, Water Contractor supplied data on costs and savings, professional judgment where no published data available. This information is included in the “Codes and Standards” green section on the “Fixtures” worksheet of each Water Contractor’s DSS Model.				

Parameter	Model Input Value, Assumptions, and Key References
Non-Residential Fixture Efficiency Current Installation Rates	U.S. Census, Housing age by type of dwelling plus natural replacement plus rebate program (if any). Assume commercial establishments built at same rate as housing, plus natural replacement. This information is included in the “Codes and Standards” green section of each Water Contractor’s DSS Model by customer category fixtures.
Residential Frequency of Use Data, Toilets, Showers, Washers, Uses/user/day	Falls within ranges in AWWARF Report “Residential End Uses of Water” 1999. This information is included in the “Codes and Standards” green section on the “Fixtures” worksheet of each Water Contractor’s DSS Model, and confirmed in each “Service Area Calibration End Use” worksheet by customer category.
Non-Residential Frequency of Use Data, Toilets and Urinals, Uses/user/day	Estimated based using AWWARF Report “Commercial and Institutional End Uses of Water” 2000. This information is included in the “Codes and Standards” green section on the “Fixtures” worksheet of each Water Contractor’s DSS Model, and confirmed in each “Service Area Calibration End Use” worksheet by customer category.
Natural Replacement Rate of Fixtures	Residential Toilets 2% (1.28 gpf and 1.6 gpf toilets), 2.5% (3.5 gpf and higher toilets)
	Commercial Toilets 2% (1.28 gpf and 1.6 gpf toilets), 2.5% (3.5 gpf and higher toilets)
	Residential Showers 4%
	Residential Clothes washers 10%
	A 4% replacement rate corresponds to 25 year life of a new fixture.
	A 10% replacement rate corresponds to 10 year washer life based on 2014 AWWARF Report “Residential End Uses of Water” and “Bern Clothes Washer Study,” Final Report, Energy Division, Oak Ridge National Laboratory, for U.S. Department of Energy, March 1998. Online: www.energystar.gov
	This information is included in the “Codes and Standards” green section on the “Fixtures” worksheet of each Water Contractor’s DSS Model.
Future Residential Water Use	Increases Based on Population Growth and Demographic Forecast
Future Non-Residential Water Use	Increases Based on Employment Growth and Demographic Forecast

3.4 Water Use Targets

SB X7-7 or “The Water Conservation Act of 2009” was enacted to ensure California continues to have reliable water supplies, requiring urban water agencies to collectively reduce statewide per capita water use by 20% before December 31, 2020. The law establishes that the base daily per capita use be based on total gross water use, divided by the service area population. Each Water Contractor has a different per capita consumption baseline value and year 2020 water use target.

In tracking per capita water use, which is measured in gallons per capita per day (GPCD), the primary project driver is the SB X7-7 20x2020 compliance requirements that require calculation using population in future UWMPs including tracking of: baseline GPCD (10 years between 1994 and 2010), a 2015 target, and a 2020 target. The Water Contractor used

2010 census data in their estimation of population for baseline years and the determination of baseline GPCD. The year 2020 SB X7-7 GPCD target for Valley of the Moon Water District is 124¹. VOMWD has also elected to track their year 2018 CUWCC GPCD target of 119.87.

3.5 Water Demand Projections With and Without the Plumbing Code

Water demand projections were developed to the year 2040 using the DSS Model. Table 3-3 shows projected demands in 5-year increments with and without plumbing codes and appliance standards. Information and assumptions about plumbing code and appliance standards can be found in Appendix A.

The demand projections reflect average water use assuming average weather conditions and **do not** reflect drier and hotter drought conditions. Likewise, climate change (which might alter weather patterns), increased or decreased rainfall, and possibly increased irrigation demand in the spring and fall due to a warmer climate have **NOT** been addressed in this analysis.

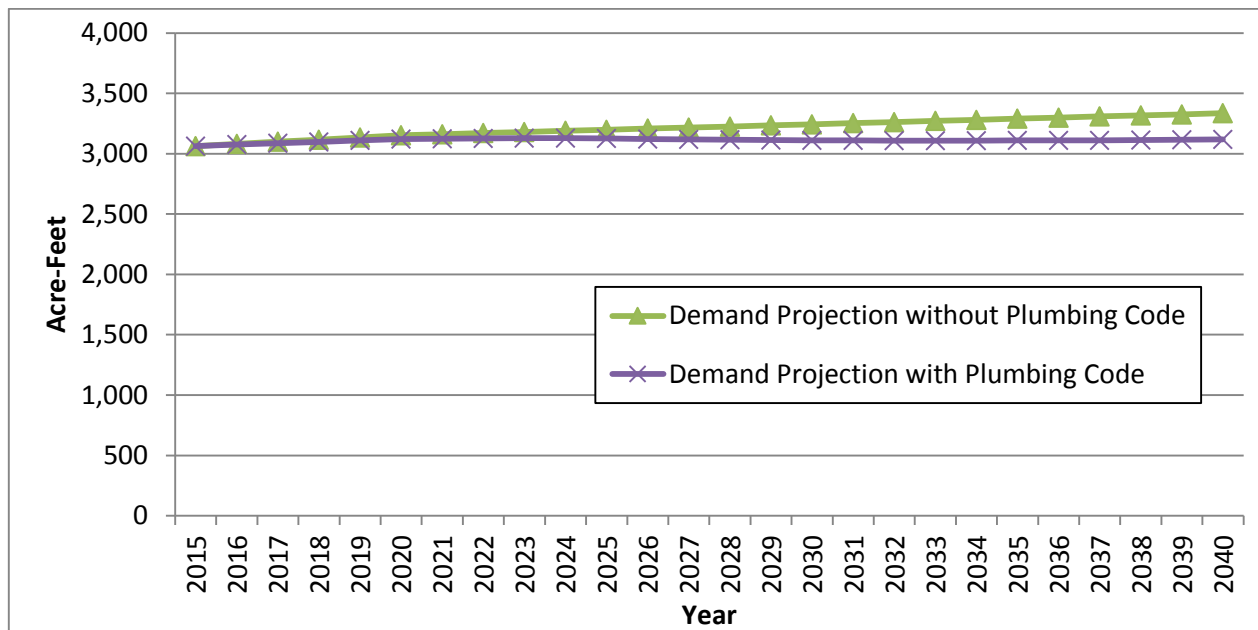
Table 3-3. Potable Water Use Projections (Acre-Feet/Year)*

	2015	2020	2025	2030	2035	2040
Demand without Plumbing Code (AFY)	3,063	3,152	3,198	3,244	3,290	3,336
Demand with Plumbing Code (AFY)	3,063	3,121	3,125	3,111	3,110	3,117

*Data is not weather normalized. Total water use is potable only. Does not include recycled water use. Recycled water use and projection are in a separate section in the UWMP. Values include NRW.

Figure 3-3 shows the potable water demand projections with and without the plumbing code through 2040.

Figure 3-3. Potable Water Use Projections for Valley of the Moon Water District (AFY)



¹ Source: Valley of the Moon 2010 Urban Water Management Plan Table 3.4.

3.6 Water Demand Projections – 2015 Urban Water Management Plan (UWMP) Format

The draft 2015 Urban Water Management Plan Guidance Document from the California Department of Water Resources (CA DWR) was released in April 2015 and the final guidance document is not planned to be released until after July 1, 2015. Without the final guidance document, the exact formatting of the tables for the 2015 UWMP are not known. Therefore, it was elected to place the demand data into the draft 2015 UWMP format.

The 2015 draft Urban Water Management Plan Guidance Document from the California Department of Water Resources requests that future demand information be in a specific format. The following tables are the 2015 draft UWMP tables relating to population and demand that are requested. The demand projection shown is the “with Plumbing Code” demands and is otherwise the same as Table 3-3 and Figure 3-3.

Table 3-4 below provides population projections for the service area.

Table 3-4. (DWR Table 2-2) Population – Current and Projected

	2015	2020	2025	2030	2035	2040
Population Served	24,174	24,873	25,229	25,586	25,943	26,300

The current and projected number of connections and deliveries to the Water Contractor’s water distribution system, by sector, are identified in the following Table 3-5 and Table 3-6. Deliveries include plumbing code savings but do not include non-revenue water (NRW).

Table 3-5. Demands and Accounts by Customer Category*

		Single Family	Multi-family	Commercial	Irrigation MF Residential	Irrigation Commercial	Institutional	Total (no NRW)
2015	# of accounts	6,215	437	167	20	12	34	6,884
	Deliveries AFY	1,842	525	199	34	19	100	2,718
2020	# of accounts	6,394	450	172	21	12	35	7,084
	Deliveries AFY	1,878	533	202	35	19	103	2,769
2025	# of accounts	6,486	456	175	21	13	35	7,186
	Deliveries AFY	1,881	529	203	35	19	104	2,772
2030	# of accounts	6,578	463	178	21	13	36	7,288
	Deliveries AFY	1,871	522	205	36	20	106	2,759
2035	# of accounts	6,669	469	180	21	13	36	7,390
	Deliveries AFY	1,870	519	206	36	20	107	2,758
2040	# of accounts	6,761	476	183	22	13	37	7,492
	Deliveries AFY	1,874	518	207	37	20	109	2,765

*Based on Demand WITH Plumbing Code, excluding NRW.

Table 3-6. (DWR Table 3-1) Retail Uses of Potable and Raw Water - Actual and Projected (Acre-Feet/Year)

Use Type	2015	2020	2025	2030	2035	2040
Single Family	1,842	1,878	1,881	1,871	1,870	1,874
Multi-family	525	533	529	522	519	518
Commercial	199	202	203	205	206	207
Irrigation MF Residential	34	35	35	36	36	37
Irrigation Commercial	19	19	19	20	20	20
Institutional	100	103	104	106	107	109
Total	2,718	2,769	2,772	2,759	2,758	2,765

For this project, losses or non-revenue water (NRW) is defined as the difference between total water produced and water sold to customers. Non-revenue water use normally includes unmetered water use, such as for fire protection and training, system and street flushing, sewer cleaning, construction, system leaks, meter inaccuracy, and unauthorized connections. Non-revenue water can also result from meter inaccuracies. The total current and future water losses for the system are shown in Table 3-7.

Table 3-7. (DWR Table 3-4) Losses from Potable Water System (Acre-Feet/Year)*

	2015	2020	2025	2030	2035	2040
Potable System	345	352	354	352	351	352

*Losses represented in Table 3-7 do not reflect actual system losses for future years. Table 3-7 projects losses at a historical rate, whereas the actual savings from reducing losses is reflected in table 3-8 through reductions in retail uses.

The total current and future water use for the system is shown in the table below.

Table 3-8. (DWR Table 3-6) Total Potable Water Use (Acre-Feet/Year)*

	2015	2020	2025	2030	2035	2040
Retail Uses	2,718	2,769	2,772	2,759	2,758	2,765
Losses	345	352	354	352	351	352
Total	3,063	3,121	3,125	3,111	3,110	3,117

*Total water use is potable only. Does not include recycled water use. Recycled water use and projection are in another section of the UWMP.

Passive savings due to plumbing codes and standards as well as documented historical conservation activity are presented in the following Table 3-9. These savings include savings from toilets, urinals, showerheads and clothes washers.

Table 3-9. (DWR Table 3-8) Passive Savings (Acre-Feet/Year)*

	2015	2020	2025	2030	2035	2040
Total Passive Savings	-	31	73	133	180	218

*Passive savings are accounted for in the water use projections in DWR Table 3-1.

4. COMPARISON OF INDIVIDUAL CONSERVATION MEASURES

This section presents the conservation measure screening process, a description of the measures selected to be analyzed in the Water Contractor's DSS Model, measure design assumptions and modeling methodology, and a comparison of the individual conservation measure costs and savings.

4.1 Selecting Conservation Measures to be Evaluated (Conservation Measure Screening)

An important step in updating the water conservation program is the review and screening of new water conservation measures. New measures were designed with an implementation schedule reflecting dates sometime in the future when the Water Contractor might begin such programs. The first step in the conservation analysis was to review historical water conservation activity and savings. The purpose of this review was to look at historically successful programs, past penetration rates (activity levels) for individual measures, and the types of programs that were implemented (and for which customers – single family, multi-family, commercial, etc.) by each of the Water Contractors since the 2010 UWMP. The participation rates were incorporated into the design of each of the 25 conservation measure activity levels in the DSS Model analysis.

Following the review of the historical conservation efforts, a list of over 50 potential conservation measures was provided to each Water Contractor to be considered for further evaluation in the DSS Model. This list of measures was then screened by SMSWP and the Water Contractors to: (1) identify those measures with the highest level of interest and potential for implementation within the region and (2) identify which entity (SMSWP or individual Water Contractors) would be best suited to implement each measure. Through this process, a total of 25 measures were selected for analysis in the individual Water Contractor DSS models. The screening process and results are described in Appendix C. Once the 25 measures were selected for analysis, a master measure design database (MMDD) was created to streamline the individual measure design process by being a starting point for all the Water Contractor's measures so that measure design parameters such as target end uses, customer classes, unit costs and savings would initially align.

4.2 Conservation Measures Evaluated

Table 4-1 includes the 25 water use efficiency measures that were included in the DSS Model analysis. The table includes measures, devices and programs (e.g., direct install high efficiency toilets) that can be used to achieve water use efficiency, methods through which the device or program will be implemented and what distribution method, or mechanism, can be used to activate the device or program. The list of potential measures was drawn from MWM and Water Contractor general experience and review of local Water Contractor's water use efficiency programs. The measure descriptions apply generally to each Water Contractor; Water Contractor-specific measure descriptions can be found in Appendix D where screen shots of every conservation measure's inputs from each Water Contractor's DSS Model are presented.

Water use efficiency savings due to plumbing codes such as CALGreen (California Statewide New Development Building Code), SB 407 (Plumbing Fixture Retrofit on Resale or Remodel), and any new development ordinances specific to each individual Water Contractor are included in the DSS Model and presented in Appendix A.

Table 4-1. Water Use Efficiency Measure Descriptions

No.	Measure Name	Measure Description
1	Water Loss	WATER CONTRACTOR MEASURE: Maintain a thorough annual accounting of water production, sales by customer class and quantity of water produced and billed consumption (to define non-revenue water). In conjunction with system accounting, include water system audits that identify and quantify known legitimate uses of non-revenue water in order to determine remaining potential for reducing real (physical) water losses. Goal would be to lower the Infrastructure Leakage Index (ILI) and real water losses water every year by a pre-determined amount based on cost-effectiveness. These programs typically pay for themselves based on savings in operational costs (and saved rate revenue can be directed more to system repairs/replacement and other costs) and recovered revenue through addressing apparent losses. Specific goals and methods to be developed by Utility. May include accelerated main and service line replacement. Enhanced real loss reduction may include more ambitious main replacement and active leak detection. Capture water from water main flushing and hydrant flow testing for reuse.
2	AMI	WATER CONTRACTOR MEASURE: Retrofit system with AMI meters and associated network capable of providing continuous consumption data to Utility offices. Improved identification of system and customer leaks is a major conservation benefit. Some costs of these systems are offset by operational efficiencies and reduced staffing, as regular meter reading and opening and closing accounts are accomplished without the need for a site visit. Also enables enhanced billing options and ability to monitor unauthorized usage, such as use/tampering with closed accounts or irrigation when time of day or days per week are regulated. Customer service is improved as staff can quickly access continuous usage records to address customer inquiries. Optional features include online customer access to their usage, which has been shown to improve accountability and reduce water use. A five-year change-out would be a reasonable objective and may take longer if coupled with a full meter replacement program (on the order of 10 years). Require that new, larger or irrigation customers install such AMI meters as described above and possibly purchase means of viewing daily consumption inside their home, business, or by their landscape/property managers, either through the Internet (if available) or separate device. The AMI system would, on demand, indicate to the customer and Utility where and how their water is used, facilitating water use reduction and prompt leak identification. This would require Utility to install an AMI system.
3	Pricing	WATER CONTRACTOR MEASURE: Assumes average annual price increase of 5% for the next 25 years unless otherwise specified by the Water Contractors. Measure converts price increases to real price increases net of inflation; Annual increase must be above user set threshold (such as assuming a 2% inflation) to trigger a demand reduction.
4	Public Info & School Education - SMSWP	REGIONAL MEASURE: Continue with regional public information and school education campaign. School education includes: school assembly program, classroom presentations, and other options for school education.
5	Public Info & School Education - Water Contractor	WATER CONTRACTOR MEASURE: Public information dissemination and school education initiatives beyond those conducted by SMSWP.
6	Prohibit Water Waste	WATER CONTRACTOR OR REGIONAL MEASURE: Adopt or modify ordinance that prohibits the waste of water defined as gutter flooding, restrictions on watering days and failure to repair leaks in a timely manner.
7	Indoor and	WATER CONTRACTOR OR REGIONAL MEASURE: Top water customers from each CII

No.	Measure Name	Measure Description
	Outdoor Surveys - CII	category would be offered a professional water survey that would evaluate ways for the business to save water and money. The surveys would be for targeted to large users (accounts that use more than 5,000 gallons of water per day) such as hotels, restaurants, large stores and schools. Emphasis will be on supporting the top users in each customer category.
8	Replace CII Inefficient Equipment	WATER CONTRACTOR OR REGIONAL MEASURE: After undergoing a free water use survey, SMSWP will analyze the recommendations on the provided findings report and determine if the site qualifies for a financial incentive. Financial incentives will be provided after analyzing the cost benefit ratio of each proposed project. Incentives are tailored to each individual site as each site has varying water savings potentials. Incentives will be granted at the sole discretion of SMSWP while funding lasts.
9	Efficient Toilet Replacement Program - CII	WATER CONTRACTOR MEASURE: Efficient Toilet Replacement Program - CII. Provide a rebate or voucher for the installation of a high efficiency flushometer toilet - toilets flushing 1.28 gpf or less. Rebate amounts reflect the incremental purchase cost.
10	Urinal Rebates – CII	WATER CONTRACTOR MEASURE: Provide a rebate or voucher for the installation of a high efficiency urinals. WaterSense standard is 0.5 gpf or less, though models flushing as low as 0.125 gpf (1 pint) are available and function well, so could be specified. Rebate amounts would reflect the incremental purchase cost.
11	Plumber Initiated UHET & HEU Retrofit Program	WATER CONTRACTOR MEASURE: Plumber Initiated Ultra High Efficiency Toilet (UHET) and/or Urinal Retrofit Program. The Water Contractor would subsidize the installation cost of a new UHET or High Efficiency Urinal (HEU) purchased by the Water Contractor. If elected to be run as a regional measure, then SMSWP would subsidize the installation cost of a new UHET or HEU purchased by SMSWP. Licensed plumbers, pre-qualified by SMSWP would solicit customers directly. Customers would get a new UHET and HEU installed at a discounted price.
12	Require <0.125 gal/flush Urinals in New Development	WATER CONTRACTOR MEASURE: Require that new buildings be fitted with .125 gpf (1 pint) or less urinals rather than the current standard of 0.5 gal/flush models.
13	HE Faucet Aerator / Showerhead Giveaway – CII	WATER CONTRACTOR MEASURE: High Efficiency Faucet Aerator / Showerhead Giveaway – CII. Utility would buy showerheads and faucet aerators in bulk and give them away at Utility office or community events.
14	HE Faucet Aerator / Showerhead Giveaway - SF, MF	WATER CONTRACTOR MEASURE: High Efficiency Faucet Aerator / Showerhead Giveaway - SF, MF. Utility would buy showerheads and faucet aerators in bulk and give them away at Utility office or community events. Need to coordinate this program with the School Education measure on retrofit kit giveaways to the same customer categories.
15	Indoor and Outdoor Surveys - SF, MF	REGIONAL OR WATER CONTRACTOR MEASURE: Indoor and outdoor water surveys for existing residential customers. Target those with high water use and provide a customized report to owner. May include give-away of efficient shower heads, aerators, and toilet devices. Customer leaks can go uncorrected at properties where owners are least able to pay costs of repair. These programs may require that customer leaks be repaired, with either part of the repair subsidized and/or the cost paid with revolving funds paid back with water bills over time. May also include an option to replace inefficient plumbing fixtures at low-income residences. May include adjustments to irrigation schedules on automatic irrigation controllers. Provide incentive to install pressure regulating valve on existing properties with pressure exceeding 80 psi.

No.	Measure Name	Measure Description
16	Efficient Toilet Replacement Program – SF	WATER CONTRACTOR MEASURE: Provide a rebate or voucher for the installation of an ultra-high efficiency toilet (UHET). UHET toilets flush 1.28 gpf or less and include dual flush technology. Rebate amounts would reflect the incremental purchase cost. Replacement program can be either a direct install or rebate program. Includes replacement of 1.6 gpf that are not well functioning.
17	Direct Install UHET, Showerheads, and Faucet Aerators - SF, MF	WATER CONTRACTOR OR REGIONAL MEASURE: Direct Install High Efficiency Toilets, Showerheads, and Faucet Aerators in Residential Buildings. Utility would subsidize installation cost of a new UHET purchased by the utility. Licensed plumbers, pre-qualified by the Utility would solicit customers directly. Customers would get a new UHET and showerheads and faucet aerators installed at a discounted price.
18	HE Clothes Washer Rebate - SF, MF	WATER CONTRACTOR MEASURE: Provide a rebate for efficient washing machines to residential customers. It is assumed that the rebates would remain consistent with relevant state and federal regulations (Department of Energy, Energy Star) and only offer the best available technology.
19	Submeters Incentive	WATER CONTRACTOR MEASURE: Require or provide a partial cost rebate to meter all remaining mobile home parks that are currently master metered but not separately metered. Provide a rebate (per unit) to assist MF building owners installing submeters on each existing individual apartment or condominium unit.
20	Outdoor Large Landscape Audits & Water Budgeting/Monitoring	WATER CONTRACTOR OR REGIONAL MEASURE: Outdoor water audits offered for existing large landscape customers. Normally those with high water use are targeted and provided a customized report on how to save water. All large multi-family residential, CII, and public irrigators of large landscapes would be eligible for free landscape water audits upon request. Website will provide feedback on irrigation water use (budget vs. actual). May include the cost for dedicated meter conversion.
21	Landscape Rebates and Incentives for Equipment Upgrade	WATER CONTRACTOR MEASURE: For SF, MF, CII, and IRR customers with landscape, provide a Smart Landscape Rebate Program with rebates for substantive landscape retrofits or installation of water efficient upgrades; Rebates contribute towards the purchase and installation of water-wise plants, compost, mulch and selected types of irrigation equipment upgrades including: Large Rainwater Catchment Systems, Rain Barrels, Rain Sensors, Rotating Sprinkler Nozzles, Drip Irrigation Equipment, Weather Based Irrigation Controllers and Gray Water Systems.
22	Turf Removal - MF, CII	WATER CONTRACTOR MEASURE: Provide a per square foot incentive to remove turf and replace with low water use plants or hardscape. Rebate is based on price per square foot removed, and capped at an upper limit for multi-family or commercial residence.
23	Turf Removal - SF	WATER CONTRACTOR MEASURE: Provide a per square foot incentive to remove turf and replace with low water use plants or permeable hardscape. Rebate based on dollars per square foot removed and capped at an upper limit for single family residences.
24	Water Conserving Landscape and Irrigation Codes	WATER CONTRACTOR MEASURE: Develop and enforce Water Efficient Landscape Design Standards. Standards specify that development projects subject to design review be landscaped according to climate appropriate principals, with appropriate turf ratios, plant selection, efficient irrigation systems and smart irrigation controllers. The ordinance could require certification of landscape professionals.
25	Require Smart Irrigation Controllers and Rain Sensors in New Development	WATER CONTRACTOR MEASURE: Require Weather Adjusting Smart Irrigation Controllers per CALGreen on New Development. It is optional to require Rain Sensors in CALGreen for New Development. Require developers for all properties (100%) of greater than four residential units and all commercial development to install the weather based irrigation controllers. May require landscaper training.

4.3 Water Reduction Methodology

Each conservation measure targets a particular water use such as indoor single family water use. Targeted water uses are categorized by water user group and by end use. Targeted water user groups include single family residential, multi-family residential, commercial, industrial, and institutional (CII), etc. Measures may apply to more than one water user group. Targeted end uses include indoor and outdoor use. The targeted water use is important to identify because the water savings are generated from reductions in water use for the targeted end use. For example, a residential retrofit conservation measure targets single family and multi-family residential indoor use, and in some cases specifically shower use. When considering the water savings potential generated by a residential retrofit one considers the water saved by installing low-flow showerheads in single family and multi-family homes.

The market penetration goal for a measure is the extent to which the product or service related to the conservation measure occupies the potential market. In essence, the market penetration goal identifies how many fixtures, rebates, surveys, etc. the wholesale customer would have to offer or conduct over a period of time to reach its water savings goal for that conservation measure. This is often expressed in terms of the number of fixtures, rebates, surveys, etc. offered or conducted per year.

The potential for errors in market penetration goal estimates for each measure can be significant because they are based on previous experience, chosen implementation methods, projected utility effort, and funds allocated to implement the measure. The potential error can be corrected through re-evaluation of the measure as the implementation of the measure progresses. For example, if the market penetration required to achieve specific water savings turns out to be more or less than predicted, adjustments to the implementation efforts can be made. Larger rebates or additional promotions are often used to increase the market penetration. The process is iterative to reflect actual conditions and helps to ensure that market penetration and needed savings are achieved regardless of future variances between estimates and actual conditions.

In contrast, market penetration for mandatory ordinances can be more predictable with the greatest potential for error occurring in implementing the ordinance change. For example, requiring dedicated irrigation meters for new accounts through an ordinance can assure an almost 100 percent market penetration for affected properties.

Water contractors are constantly looking at when a measure reaches saturation. Baseline surveys are the best approach to having the most accurate information on market saturation. This was taken into account when analyzing individual conservation measures where best estimates were made. MWM was not provided with any baseline surveys for this analysis, but discussions were held with the individual Water Contractors on what their best estimates were for saturation for their service area.

4.4 Perspectives on Benefits and Costs

The determination of the economic feasibility of water conservation programs involves comparing the costs of the programs to the benefits provided. This analysis was performed using the DSS Model developed by MWM. The DSS Model has received the endorsement of the California Urban Water Conservation Council, and calculates cost effectiveness of conservation measure savings at the end-use level; for example, the model determines the amount of water a toilet rebate program saves in daily toilet use for each single family account. Additional detail on the DSS Model and assumptions can be found in Appendix A.

4.5 Present Value Parameters

The time value of money is explicitly considered. The value of all future costs and benefits is discounted to 2015 (the model start year) at the real interest rate of 3.01%. The DSS Model calculates this real interest rate, adjusting the current nominal interest rate (assumed to be approximately 6.1%) by the assumed rate of inflation (3.0%). The formula to calculate the real interest rate is: $(\text{nominal interest rate} - \text{assumed rate of inflation}) / (1 + \text{assumed rate of inflation})$. Cash flows discounted in this manner are subsequently referred to as “Present Value” sums. Additional information on Present Value referenced in Appendix A.

4.6 Measure Assumptions including Unit Costs and Water Savings

Appendix D presents the assumptions and inputs used in the Water Contractor's DSS Model to evaluate each water conservation measure. Assumptions regarding the following variables were made for each measure:

- Targeted Water User Group End Use – Water user group (e.g., single family residential) and end use (e.g., indoor or outdoor water use).
- Utility Unit Cost – Cost of rebates, incentives, and contractors hired (by Water Contractor or SMSWP) to implement measures. The assumed dollar values for the measure unit costs were closely reviewed by staff and are found to be adequate for each individual measure. The values in the majority of cases are in the range of what is currently offered by other water utilities in the region.
- Retail Customer Unit Cost – Cost for implementing measures that is paid by retail customers (i.e., the remainder of a measure's cost that is not covered by a utility rebate or incentive).
- Utility Administration and Marketing Cost – The cost to the utility for administering the measure, including consultant contract administration, marketing, and participant tracking. The mark-up is sufficient (in total) to cover conservation staff time and general expenses and overhead.

Costs are determined for each of the measures based on industry knowledge, past experience and data provided by the Water Contractor. Costs may include incentive costs, usually determined on a per-participant basis; fixed costs, such as marketing; variable costs, such as the costs to staff the measures and to obtain and maintain equipment; and a one-time set-up cost. The set-up cost is for measure design by staff or consultants, any required pilot testing, and preparation of materials that are used in marketing the measure. Measure costs are estimated each year between 2015 and 2040. Costs are spread over the time period depending on the length of the implementation period for the measure and estimated voluntary customer participation levels.

Lost revenue due to reduced water sales is not included as a cost because the conservation measures evaluated herein generally take effect over a span of time that is sufficient to enable timely rate adjustments as necessary to meet fixed cost obligations.

Data necessary to forecast water savings of measures include specific data on water use, demographics, market penetration, and unit water savings. Savings normally develop at a measured and predetermined pace, reaching full maturity after full market penetration is achieved. This may occur three to ten years after the start of implementation, depending upon the implementation schedule.

The unit costs vary according to the type of customer account and implementation method being addressed. For example, a measure might cost a different amount for a residential single family account, than a residential multi-family account, and for a rebate versus an ordinance requirement or a direct installation implementation method. Typically water utilities have found there are increased costs associated with achieving higher market saturation, such as more surveys per year. The DSS Model calculates the annual costs based on the number of participants each year. The general formula for calculating annual utility costs is:

- Annual Utility Cost = Annual market penetration rate x total accounts in category x unit cost per account x (1+administration and marketing markup percentage)
- Annual Customer Cost = Annual number of participants x unit customer cost
- Annual Community Cost = Annual utility cost + annual customer cost

4.7 Assumptions about Avoided Costs

The most expensive source of water for almost all of the Water Contractors, and in some cases the only source of water, is the SCWA Russian River Supply. The price of the water to the Water Contractors is set by SCWA every year and varies by Water Contractor location, depending upon which aqueduct they draw from. Since 1990, the annual price of water has increased significantly. The annual rate of increase from 1989/90 to 2013/14 has varied from 4.0 to 5.1% per year, depending upon the aqueduct.

Since 1990, the annual rate of inflation has been 2.64% per year in the San Francisco Bay Area, as measured by the Consumer Price Index (CPI). Based on this data the price of SCWA water has increased faster than the CPI.

Therefore, in evaluating the benefit-cost ratio of conservation measures and programs it is appropriate to consider the net increase in benefits (i.e., the net increase in the avoided cost of water). Other costs, such as the cost of conservation, will increase presumably at the CPI rate. Also, the cost of conservation programs will be paid for with inflated dollars.

For this evaluation, the avoided costs are escalated from the 2014 value to a projected 2030 value (16 years). The total avoided cost of water escalated is the 2014 current SCWA price of water plus the chemical/treatment and pumping and distribution costs. The chemical/treatment and pumping and distribution costs were provided by the Water Contractors in their data collection workbooks.

The net increase and the water production avoided costs used in this evaluation are provided in the following table. The 2014 SCWA cost of water is escalated to a 2030 projected value using a 4% per year rate increase. The cost of treatment distribution and pumping is escalated at 2% per year.

Table 4-2. Water Contractor Avoided Costs of Water

Water Contractor	Rate Basis	SCWA FY 2014-15 Water Rates (per AF)	Estimated SCWA 2030 Water Rates (per AF)	2014 Treatment, Distribution and Pumping Costs (per AF)	Estimated 2030 Treatment, Distribution and Pumping Costs (per AF)	Total Estimated 2030 Water Production Operational Costs (per AF) ¹
City of Santa Rosa	Santa Rosa Aqueduct	\$ 730.68	\$ 1,368.55	\$0.00	\$0.00	\$1,368.55
City of Petaluma	Petaluma Aqueduct	\$ 730.68	\$ 1,368.55	\$0.23	\$0.32	\$1,368.87
City of Rohnert Park		\$ 730.68	\$ 1,368.55	\$0.00 ²	\$0.00	\$1,368.55
City of Cotati		\$ 730.68	\$ 1,368.55	\$0.00 ²	\$0.00	\$1,368.55
Valley of the Moon Water District	Sonoma Aqueduct	\$ 793.24	\$ 1,485.72	\$0.00 ²	\$0.00	\$1,485.72
City of Sonoma		\$ 793.24	\$ 1,485.72	\$0.00 ²	\$0.00	\$1,485.72
Town of Windsor	Individual Rate	\$ 876.81	\$ 1,368.55 ³	\$0.00 ²	\$0.00	\$1,368.55
North Marin Water District	Individual Rate	\$ 741.78	\$ 1,389.34	\$29.09	\$39.93	\$1,429.27
Marin Municipal Water District	Individual Rate for first 4,300 acre-feet from SCWA	\$ 786.91	\$ 1,473.87	\$65.65	\$90.12	\$1,563.99

¹ This value is used in each Water Contractor's DSS Model.

² Water Contractors did not provide specific energy/cost quantities, therefore, the distribution cost is assumed to be zero which as an avoided cost will produce a more conservation estimate for the value of conserved water.

³ Town of Windsor water rates in 2030 will change to Santa Rosa Aqueduct rates.

For those Water Contractors with wastewater operation costs including chemical, treatment, energy, and transport costs, a 2% per year escalation was used to a projected 2030 value. These values can be found in each Water Contractor's data collection workbook and DSS Model.

This avoided cost determination process has the effect of raising the benefit-cost ratios in our evaluation by the amount that is roughly the percentage difference in the future versus the current price of SCWA water. In our opinion, this escalation represents a more realistic comparison of benefits and costs of conservation.

4.8 Comparison of Individual Measures

Table 4-3 presents how much water the measures will save through 2040, how much they will cost, and what the cost of saved water will be per unit volume *if the measures are implemented on a stand-alone basis (i.e. without interaction or overlap from other measures that might address the same end use(s))*. Thus, savings from measures which address the same end use(s) are not additive. The model uses impact factors to avoid double counting in estimating the water savings from programs of measures. For example, if two measures are planned to address the same end use and both save 10% of the prior water use then the net effect is not the simple sum (20%). Rather it is the cumulative impact of the first measure reducing the use to 90% of what it was without the first measure in place and then reducing the use another 10% to result in the use being 81% of what it was originally. In this example the net savings is 19%, not 20%. Using impact factors, the model computes the reduction as follows, $0.9 \times 0.9 = 0.81$ or 19% water savings.

Since interaction between measures has **not** been accounted for in Table 4-3, it is **not** appropriate to include totals at the bottom of the table. However, the table is useful to give a close approximation of the cost effectiveness of each individual measure.

Cost categories are defined below:

- Utility Costs - those costs that the Water Contractor as a water utility will incur to operate the measure including administrative costs.
- Utility Benefits - the avoided cost of producing water.
- Customer Costs - those costs customers will incur to implement a measure in the Water Contractor's service area and maintain its effectiveness over the life of the measure.
- Customer Benefits - the savings other than from reduced water/sewer utility bills, such as energy savings resulting from reduced use of hot water. Conservation program participants will see lower water and sewer bills but overall there will be no net customer benefit.
- Community Costs and Benefits - Community Costs and Benefits include Utility Costs plus Customer Costs, and Utility Benefits plus Customer Benefits, respectively.

The column headings in Table 4-3 are defined as follows:

- Present Value (PV) of Utility and Community Costs and Benefits (\$) = the present value of the 25-year time stream of annual costs or benefits, discounted to the base year.
- Utility Benefit-Cost ratio = PV of Utility Costs divided by PV of Utility Benefits over 25 years.
- Community Benefit-Cost ratio = (PV of Utility Benefits plus PV of customer energy savings) divided by (sum of PV of Utility Costs plus PV of Customer Costs), over 25 years.
- Five Years Total Cost to Utility (\$) = the sum of the annual Utility Costs for years 2015 through 2019. Only those measures that are run between 2015 and 2020 will have a cost. The measures start in the years as specified for each measure shown in Appendix D.

- Water Savings in 2020 (AFY) = water saved in acre-feet per year. The year 2020 is provided as this information is helpful as relates to the statewide SB X7-7 legislation (the legislation is described earlier in this Plan).
- Utility Cost of Water Saved per Unit Volume (\$/AF) = PV of Utility Costs over 25 years divided by the 25-Year Water Savings. This value is compared to the utility's avoided cost of water as one indicator of the cost effectiveness of conservation efforts. It should be noted that the value somewhat undervalues the cost of savings because program costs are discounted to present value and the water benefit is not.

Table 4-3. Conservation Measure Cost and Savings

Measure	Present Value of Water Utility Benefits	Present Value of Community Benefits	Present Value of Water Utility Costs	Present Value of Community Costs	Water Utility Benefit to Cost Ratio	Community Benefit to Cost Ratio	Five Years of Water Utility Costs 2015-2020 ¹	Water Savings in 2020 (AFY)	Cost of Savings per Unit Volume (\$/AF)
Water Loss	\$1,388,855	\$1,388,855	\$1,249,853	\$1,249,853	1.11	1.11	\$600,000	55.7	\$913
AMI	\$1,340,891	\$1,340,891	\$899,469	\$899,469	1.49	1.49	\$783,852	58.2	\$672
Pricing	\$194,961	\$194,961	\$319,813	\$319,813	0.61	0.61	\$50,000	53.7	\$131
Public Info & School Education - SMSWP	\$264,572	\$391,552	\$205,860	\$205,860	1.29	1.90	\$54,222	10.0	\$811
Public Info & School Education - Water Contractor	\$132,286	\$195,776	\$343,099	\$343,099	0.39	0.57	\$90,371	5.0	\$2,702
Prohibit Water Waste	\$16,159	\$16,159	\$103,151	\$171,918	0.16	0.09	\$22,990	0.7	\$6,369
Indoor and Outdoor Surveys - CII	\$211,229	\$368,015	\$289,587	\$482,645	0.73	0.76	\$75,984	8.5	\$1,392
Replace CII Inefficient Equipment	\$13,318	\$30,127	\$17,328	\$30,657	0.77	0.98	\$7,974	0.7	\$1,466
Efficient Toilet Replacement Program - CII	\$83,840	\$83,840	\$96,865	\$139,852	0.87	0.60	\$102,730	3.5	\$1,182
Urinal Rebates – CII	\$7,775	\$7,775	\$26,240	\$30,905	0.30	0.25	\$22,864	0.4	\$3,438
Plumber Initiated UHET & HEU Retrofit Program	\$34,855	\$34,855	\$36,612	\$45,278	0.95	0.77	\$8,665	0.8	\$1,009
Require <0.25 gal/flush Urinals in New Development	\$8,118	\$8,118	\$4,154	\$19,260	1.95	0.42	\$3,040	0.4	\$514
HE Faucet Aerator / Showerhead Giveaway – CII	\$5,696	\$14,079	\$7,165	\$19,106	0.80	0.74	\$7,598	0.7	\$1,662
HE Faucet Aerator / Showerhead Giveaway - SF, MF	\$29,942	\$62,525	\$22,789	\$60,771	1.31	1.03	\$24,169	3.6	\$1,006
Indoor and Outdoor Surveys - SF, MF	\$115,112	\$154,016	\$154,813	\$186,747	0.74	0.82	\$40,777	4.7	\$1,368
Efficient Toilet Replacement Program – SF	\$51,527	\$51,527	\$61,131	\$110,036	0.84	0.47	\$64,831	2.2	\$1,219
Direct Install UHET,	\$307,417	\$524,473	\$169,684	\$211,452	1.81	2.48	\$29,467	5.1	\$521

Measure	Present Value of Water Utility Benefits	Present Value of Community Benefits	Present Value of Water Utility Costs	Present Value of Community Costs	Water Utility Benefit to Cost Ratio	Community Benefit to Cost Ratio	Five Years of Water Utility Costs 2015-2020 ¹	Water Savings in 2020 (AFY)	Cost of Savings per Unit Volume (\$/AF)
Showerheads, and Faucet Aerators - SF, MF									
HE Clothes Washer Rebate - SF, MF	\$108,227	\$265,083	\$32,221	\$171,414	3.36	1.55	\$34,171	5.1	\$312
Submeters Incentive	\$15,990	\$24,935	\$118,352	\$149,912	0.14	0.17	-	0.1	\$6,473
Outdoor Large Landscape Audits & Water Budgeting/Monitoring	\$24,634	\$24,634	\$25,761	\$29,578	0.96	0.83	\$27,321	3.0	\$1,382
Landscape Rebates and Incentives for Equipment Upgrade	\$93,342	\$93,342	\$112,990	\$197,842	0.83	0.47	\$119,829	7.6	\$1,489
Turf Removal - MF, CII	\$74,390	\$74,390	\$97,710	\$699,005	0.76	0.11	\$55,038	2.1	\$1,291
Turf Removal - SF	\$175,812	\$175,812	\$135,977	\$972,762	1.29	0.18	\$76,619	5.0	\$760
Water Conserving Landscape and Irrigation Codes	\$57,855	\$57,855	\$18,205	\$66,750	3.18	0.87	\$7,398	1.5	\$298
Require Smart Irrigation Controllers and Rain Sensors in New Development	\$193,755	\$193,755	\$56,394	\$440,897	3.44	0.44	\$23,170	4.9	\$276

¹Some measures have no Water Utility Costs from 2015 to 2020, indicated by a dash (-) in the table. This means that there are no costs for these five years only, from 2015, inclusive, up to 2020, exclusive. It is not indicative of any activity before 2015 or during and/or after 2020. This column is meant to be helpful for budgeting purposes only.

5. RESULTS OF CONSERVATION PROGRAM EVALUATION

This section describes the process of selecting conservation measures for developing alternative conservation program scenarios and various cost, savings, and target results.

5.1 Selection of Measures for Programs

The 25 conservation measures were incorporated into each Water Contractor's DSS Model for cost-benefit analysis and selection of a conservation program to meet the Water Contractor's goals. Included in each Water Contractor's DSS Model was a list of measures in each of three alternative conservation programs (Programs A, B, and C), which were designed to illustrate a range of various measure combinations and resulting water savings. Four key items were taken into consideration during measure selection for Programs A, B, and C:

- Existing Water Contractor water use efficiency measures;
- Programs run by SMSWP;
- Measures focused on Programmatic BMP defined by the CUWCC's Memorandum of Understanding if the individual Water Contractor had reported on a measure; and
- New and innovative measures.

These programs are not intended to be rigid frameworks but rather to demonstrate the range in savings that could be generated if selected measures were run together. For each Water Contractor the three program scenarios are organized as follows:

- **Program A:** "Existing Program" option includes the measures that the Water Contractor currently offers. These measures are not necessarily designed the way they are currently implemented having, in some cases, more aggressive annual account targets. Again, though Program A represents the conservation measures each Water Contractor is currently implementing, it is important to note that these measures are designed in each Water Contractor's DSS Model to represent how the measure will be implemented in the future and not necessarily how it has historically been implemented.
- **Program B:** "Optimized Program" represents measures that are either a code requirement or CUWCC-required option for conservation. This program essentially represents the minimum conservation action required for compliance. These measures are not necessarily designed the way they are currently implemented, having, in some cases, more aggressive annual account targets. These measures are typically cost-effective and save significant amounts of water. Key benchmarks for the proposed strategies include: (1) cost-effectiveness, (2) compliance with CUWCC's BMPs, (3) ability to help achieve water use reduction targets by 2020 (SB X7-7) if applicable for the individual Water Contractor, (4) reflects reasonable predicted annual water contract budget allocations for water conservation activities.
- **Program C:** "All Measures Analyzed" presents a scenario where all 25 measures are implemented. Though it is unlikely that the Water Contractor would elect to implement all the measures, this program offers the opportunity to explore what the water savings (and costs) would potentially be should the Water Contractor implement such an extensive conservation program.

The Water Contractor's DSS Model presents estimated average per capita per day savings with the plumbing codes only, and each of the alternative programs (Program A, B, and C). Plumbing code includes current state and federal standards (including CALGreen, Senate Bill 407 and Assembly Bill 715) for items such as toilets, showerheads, faucets, pre-rinse spray valves. SB 407 and AB 715 require the replacement of non-water conserving plumbing fixtures with water-conserving fixtures.

The Water Contractor was provided a copy of the DSS Model to review the conservation program options, tailor the programs to meet its needs, and select the program that fit its individual water savings goals and budgets. The reasons

that each member Water Contractor selected a particular suite of measures varied and included the following consideration:

- Measure cost-effectiveness to Water Contractor
- Applicability to service area
- Amount of water savings generated
- Cost to Water Contractor
- Ease of implementation for Water Contractor and staffing required
- Whether the measure was being run by SCWA or SMSWP
- Local preferences

The following figure displays which measures are in each program.

Figure 5-1. Conservation Measures Selected for Programs

Program Scenarios				
 Program Scenarios	Measures	Program A	Program B	Program C
	Water Loss	✓	✓	✓
	AMI	✓	✓	✓
	Pricing	✓	✓	✓
	Public Info & School Education - SMWSP	✓	✓	✓
	Public Info & School Education - Water Contractor	✓	✓	✓
	Prohibit Water Waste	✓	✓	✓
	Indoor and Outdoor Surveys - CII	✓	✓	✓
	Replace CII Inefficient Equipment	✓	✓	✓
	Efficient Toilet Replacement Program - CII	✓	✓	✓
	Urinal Rebates – CII	✓	✓	✓
	Plumber Initiated UHET & HEU Retrofit Program	✓	✓	✓
	Require <0.25 gal/flush Urinals in New Development	✓	✓	✓
	HE Faucet Aerator / Showerhead Giveaway – CII	✓	✓	✓
	HE Faucet Aerator / Showerhead Giveaway - SF, MF	✓	✓	✓
	Indoor and Outdoor Surveys - SF, MF	✓	✓	✓
	Efficient Toilet Replacement Program – SF	✓	✓	✓
	Direct Install UHET, Showerheads, and Faucet Aerators - SF, MF	✓	✓	✓
	HE Clothes Washer Rebate - SF, MF	✓	✓	✓
	Submeters Incentive	✓	✓	✓
	Outdoor Large Landscape Audits & Water Budgeting/Monitoring	✓	✓	✓
	Landscape Rebates and Incentives for Equipment Upgrade	✓	✓	✓
	Turf Removal - MF, CII	✓	✓	✓
	Turf Removal - SF	✓	✓	✓
	Water Conserving Landscape and Irrigation Codes	✓	✓	✓
	Require Smart Irrigation Controllers and Rain Sensors in New Development	✓	✓	✓

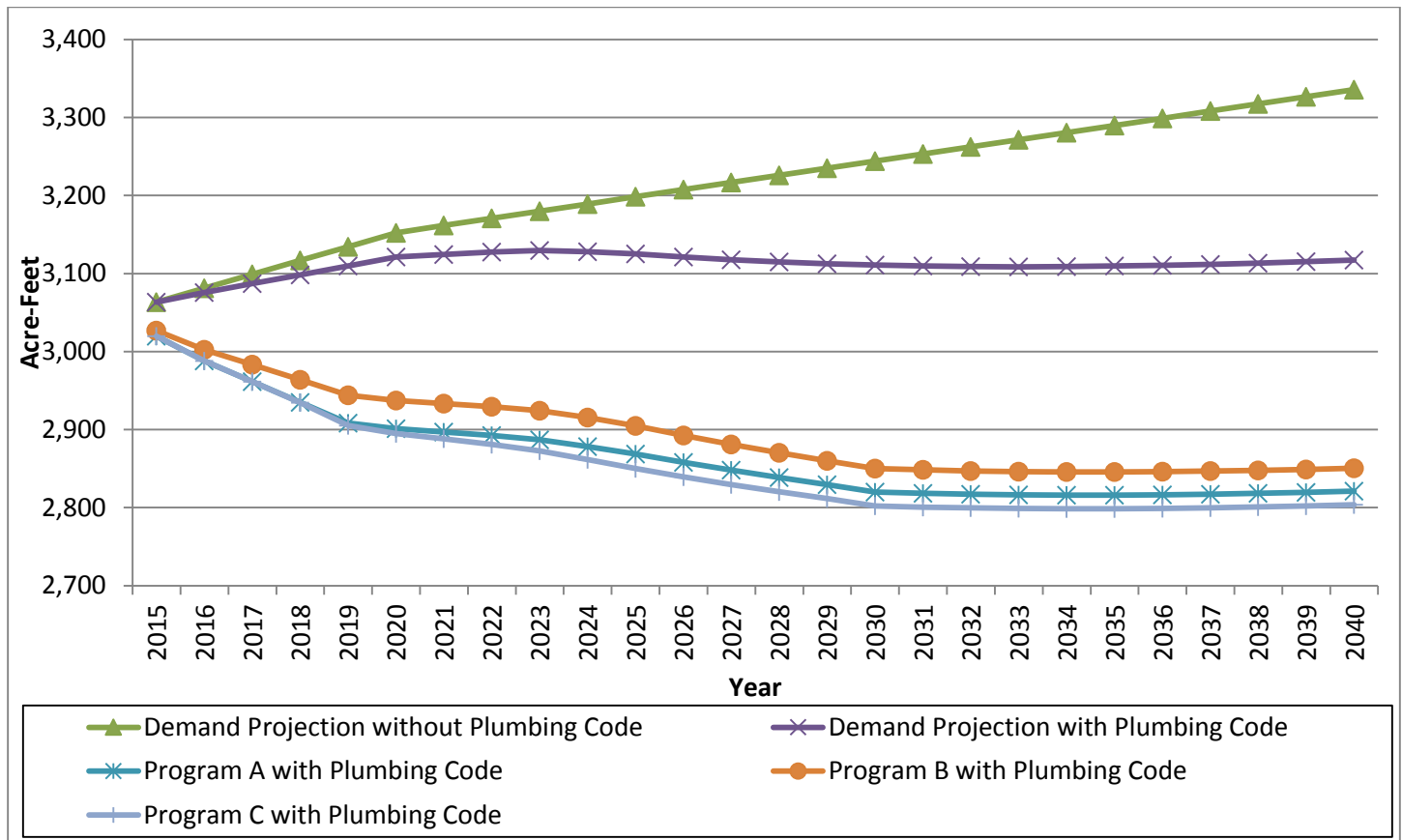
5.2 Results of Program Evaluation

The following table and Figure 5-2 shows annual water demand with no conservation (plumbing code only) and the three conservation programs.

Table 5-1. Potable Water Use Projections (Acre-Feet/Year)*

	2015	2020	2025	2030	2035	2040
Demand without Plumbing Code (AFY)	3,063	3,152	3,198	3,244	3,290	3,336
Demand with Plumbing Code (AFY)	3,063	3,121	3,125	3,111	3,110	3,117
Demand with Plumbing Code and Program A	3,020	2,901	2,869	2,820	2,816	2,821
Demand with Plumbing Code and Program B	3,027	2,937	2,905	2,850	2,846	2,850
Demand with Plumbing Code and Program C	3,020	2,895	2,850	2,802	2,799	2,804

*Data is not weather normalized. Total water use is potable only. Does not include recycled water use. Recycled water use and projection are in a separate section in the UWMP.

Figure 5-2. Long Term Demands with Conservation Programs

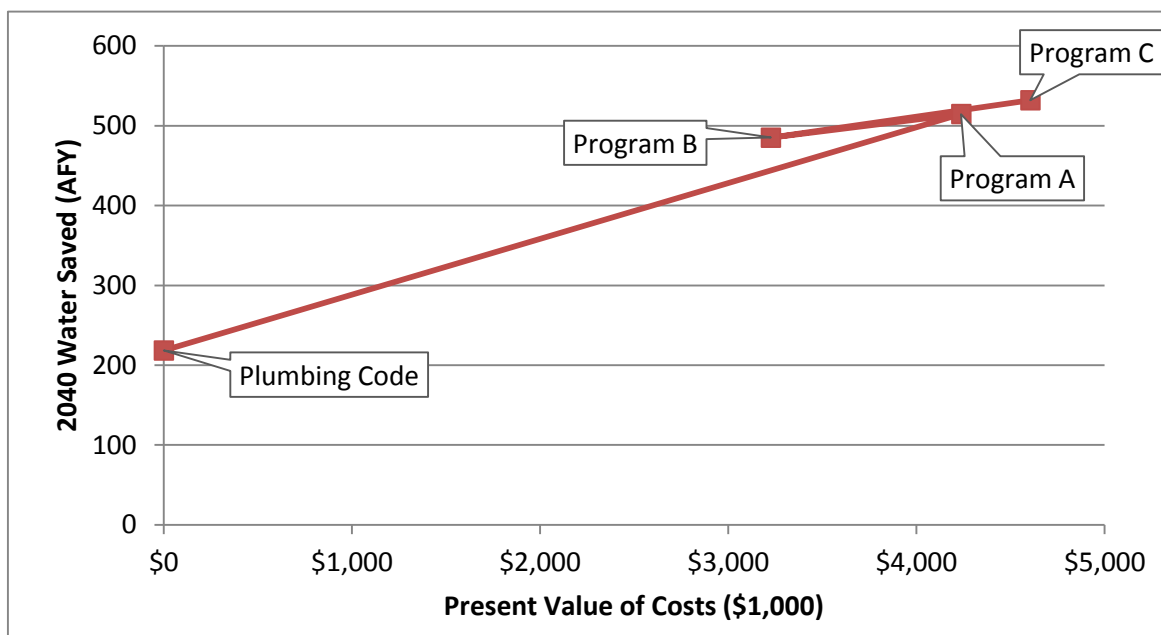
Note: All line types shown in the legend are presented in the graph. The following demand scenarios, Program A, Program B, and Program C, are close in value and therefore may be indistinguishable in the figure.

Table 5-2 shows the savings in 5-year increments for all three conservation programs; these are from the conservation programs alone and include the plumbing code savings. The separate starting points for the demand with and without the plumbing code versus the conservation programs is directly correlated to the variation in individual measures selected for each individual Program A, B, and C.

Table 5-2. Long Term Conservation Program Savings

Conservation Program Water Savings (AFY)	2015	2020	2025	2030	2035	2040	Water Utility Benefit to Cost Ratio	Community Benefit to Cost Ratio
Plumbing Code	-	31	73	133	180	218	N/A	N/A
Program A with Plumbing Code	43	251	330	424	474	515	1.50	1.05
Program B with Plumbing Code	36	215	294	394	444	485	1.71	1.59
Program C with Plumbing Code	43	257	348	442	491	532	1.45	1.06

Figure 5-3 shows how marginal returns change as more money is spent to achieve savings. Most recently it may be impacted by the goals set forth by SB X7-7, which calls for a reduction in per capita water use by 2020 (this is independent of the economic analysis).

Figure 5-3. Present Value of Utility Costs versus Cumulative Water Saved

Note: The scenarios above, Program A, Program B, and Program C, have different measures included in each program with recommended Program B more streamlined for fewer measures that are estimated to save more water as part of the optimized program design.

Table 5-3 presents key evaluation statistics compiled from the DSS Model. Assuming each program's measures are successfully implemented, projected indoor, outdoor and total water savings for 2040 in AFY are shown; these savings do include plumbing code savings. Savings and costs in the following table are a result of each program's conservation measures and any plumbing codes. Total present value costs and savings are estimated over the 25 year analysis period using an interest rate of 3%. The cost of water saved is presented for the utility. These cost parameters are derived from the annual time stream of utility, customer, and community costs.

Table 5-3. Comparison of Long-Term Conservation Programs – Utility Costs and Savings

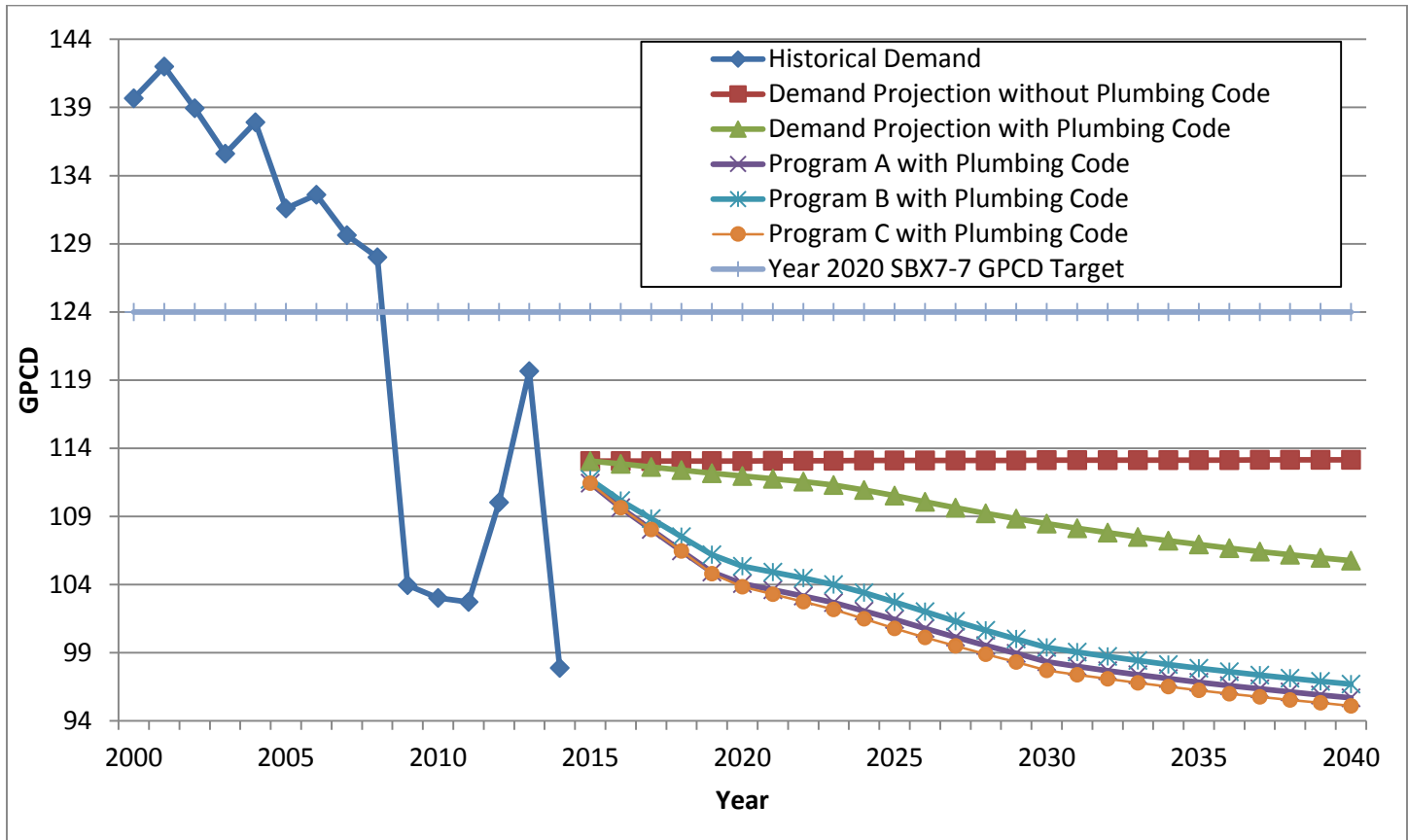
	2040 Indoor Water Savings (AFY)	2040 Outdoor Water Savings (AFY)	2040 Total Water Savings (AFY)	Present Value of Water Savings (\$)	Present Value of Utility Costs (\$)	Present Value of Community Costs (\$)	Cost of Utility Savings per Unit Volume (\$/AF)
Program A with Plumbing Code	262	252	515	\$6,336,800	\$4,237,006	\$6,786,677	\$665
Program B with Plumbing code	248	237	485	\$5,522,864	\$3,225,797	\$3,777,536	\$577
Program C with Plumbing Code	279	253	532	\$6,664,041	\$4,605,222	\$7,254,882	\$685

The following table presents the year 2020 GPCD target and Program A, B, and C GPCD estimates for the Water Contractor.

Table 5-4. Water Conservation Program Savings Projections - SB X7-7 Target GPCD

GPCD Target Source	SB X7-7
GPCD Goal	124
GPCD Goal Year	2020
GPCD with Plumbing Code in 2020	112
GPCD Program A with Plumbing Code in 2020	104.1
GPCD Program B with Plumbing Code in 2020	105.4
GPCD Program C with Plumbing Code in 2020	103.8

The following figure presents the year 2020 GPCD target and historical and projected GPCD estimates with plumbing codes and Program A, B, and C savings.

Figure 5-4. Water Conservation Program Savings Projections – SB X7-7 Target, GPCD**Notes:**

1. All line types shown in the legend are presented in the graph. The following demand scenarios, Program A, Program B, and Program C, are close in value and therefore indistinguishable in the figure.
2. Note the decline in water use in the 2014 dry year and 2008-2011 economic recession.

6. CONCLUSIONS

This section presents a discussion of the relative savings and cost-effectiveness of the Water Contractor's alternative conservation programs.

Valley of the Moon Water District's service area has a relatively high portion of residential water use and a significant amount of outdoor water use. Consequently, residential and irrigation conservation programs produce the most savings. VOMWD's service area is not a heavy manufacturing sector, so the conservation potential in the commercial sector is relatively low. Based on the assumed avoided cost of water, water conservation programs are cost-effective. Overall conclusions are as follows:

- The change in water demands from years 2015 to 2040 are provided in Table 6-1. Five projected demand scenarios have been analyzed for the 25-year study period.
- Water savings from implementation of Program A, Program B, and Program C conservation programs would reduce water needs in 2040 by approximately 9.5%, 8.6% and 10.1% respectively when compared to 2040 potable water demand with the plumbing code.
- For Program A, B, and C measures, approximately 85% of the active conservation water savings potential in 2040 (or 49% of the water savings total if the plumbing code is included) is in reducing outdoor use; the rest is indoor use reduction potential.
- The average cost of water saved over 30 years is lower than the current price of SCWA water. Thus, measures that are cost-effective at today's water rates will be more so if SCWA rates rise in the future.
- Water savings contributed by Program A measures alone are 296 acre-feet in 2040 (active program savings).
- Water savings contributed by the Program B measures alone are 267 acre-feet in 2040 (active program savings).
- Benefit-cost ratios of Program A, Program B, and Program C conservation alternatives are 1.50, 1.71, and 1.45 respectively, indicating that all program combinations are cost-effective from the utility standpoint.

Table 6-1. Potable Water Use Projections (Acre-Feet/Year)*

	2015	2020	2025	2030	2035	2040
Demand without Plumbing Code (AFY)	3,063	3,152	3,198	3,244	3,290	3,336
Demand with Plumbing Code (AFY)	3,063	3,121	3,125	3,111	3,110	3,117
Demand with Plumbing Code and Program A	3,020	2,901	2,869	2,820	2,816	2,821
Demand with Plumbing Code and Program B	3,027	2,937	2,905	2,850	2,846	2,850
Demand with Plumbing Code and Program C	3,020	2,895	2,850	2,802	2,799	2,804

*Data is not weather normalized. Base year water demand is based on 2006-2013. 2014 was not used since it was a drought year. Total water use is potable only. Does not include recycled water use. Recycled water use and projection are in a separate section in the UWMP.

APPENDIX A - ASSUMPTIONS FOR THE DSS MODEL

The following section presents the key assumptions used in the DSS Model. The assumptions having the most dramatic effect on future demands are the natural replacement rate of fixtures, how residential or commercial future use is projected, and finally the percent of estimated real water losses. This section presents DSS Model assumptions regarding plumbing code water savings, present value parameters, and active conservation measure costs and savings.

A.1 Plumbing Codes and Legislation

The DSS Model incorporates the following three items as a “code” meaning that the savings are assumed to occur and are therefore “passive” savings.

1. National Plumbing Code
2. CALGreen
3. AB 715
4. AB 407

Each of the three items is described below. In the sections following the descriptions is information on how the DSS Model handles these items and what information is needed for input.

National Plumbing Code

The Federal Energy Policy Act of 1992, as amended in 2005 requires only fixtures meeting the following standards can be installed in new buildings:

- Toilet – 1.6 gal/flush maximum
- Urinals – 1.0 gal/flush maximum
- Showerhead - 2.5 gal/min at 80 psi
- Residential Faucets – 2.2 gal/min at 60 psi
- Public Restroom Faucets - 0.5 gal/min at 60 psi
- Dishwashing pre-rinse spray valves – 1.6 gal/min at 60 psi

Replacement of fixtures in existing buildings is also governed by the Federal Energy Policy Act that requires only devices with the specified level of efficiency (shown above) can be sold today (since 2006). The net result of the plumbing code is that new buildings will have more efficient fixtures and old inefficient fixtures will slowly be replaced with new more efficient models. The national plumbing code is an important piece of legislation and must be carefully taken into consideration when analyzing the overall water efficiency of a service area.

In addition to the plumbing code the US Department of Energy regulates appliances such as residential clothes washers. Regulations to make these appliances more energy efficient has driven manufactures to dramatically reduce the amount of water these efficient machines use. Generally, front loading washing machines use 30 to 50% less water than conventional models (which are still available). In a typical analysis the DSS Model forecasts a gradual transition to high efficiency clothes washers (using 12 gallons or less) so that by the year 2025 this will be the only type of machines purchased. In addition to the industry becoming more efficient, rebate programs for washers have been successful in encouraging customers to buy more water efficient models. Given that machines last about 10 years, eventually all machines will be of this type. In 2012, the United States Environmental Protection Agency estimated the Energy Star clothes washer market share in the US in 2011 to be over 60%. Energy Star washing machines have a water factor (WF) of 6.0 or less. A WF of 6.0 is the equivalent of using 3.1 cubic feet or 23.2 gallons of water per load.

State Building Code – CALGreen

The CALGreen requirements effect all new development in the State of California after January 1, 2011. The new development requirements under CALGreen are listed in the following figure. MWM added the CALGreen requirements that effect all new development in the State of California after January 1, 2011. MWM modeled water savings from the CALGreen building code by adding Multi-family and Commercial customer categories as appropriate to applicable conservation measures.

Table A-1. CALGreen Building Code Summary Table

CALGreen Building Code						
Building Class	Component	Effective Date*	Indoor Fixtures Included	Indoor Requirement	Landscaping & Irrigation Requirements	Are the Requirements Mandatory?
Residential	Indoor	1/1/2011	Toilets, Showers, Lavatory & Kitchen Faucets, Urinals	Achieve 20% savings overall below baseline		Yes
	Outdoor	1/1/2011			Provide weather adjusting controllers	Yes
Non Residential	Indoor	1/1/2011	Submeter leased spaces	Only if building >50,000 sq. ft. & if leased space use >100 gpd		Yes
			Toilets, Showers, Lavatory & Kitchen Faucets, Wash Fountains, Metering Faucets, Urinals	Achieve 20% savings overall below baseline		Yes
	Outdoor	1/1/2011			Provide water budget	> 1,000 sq ft. landscaped area
					Separate meter	As per Local or DWR ordinance
					Prescriptive landscaping requirements	> 1,000 sq ft. landscaped area
					Weather adjusting irrigation controller	Yes

* Effective date is 7/1/2011 for toilets.

New Development Ordinances – Water Contractor-Specific

The new development ordinances for each Water Contractor are listed in the following Table A-2 below.

Table A-2. New Development Ordinances

New Development (ND) Measure	NMWD	City of Rohnert Park ¹	City of Cotati ²	City of Santa Rosa	Town of Windsor	City of Sonoma	Valley of the Moon WD	Marin Municipal Water District	City of Petaluma	CALGreen Requirement
Applicability (Customer Classes)	All	All	All	All	All	All	All	All	All	All
ND1-Rain Sensor Retrofit	2005	No	No	2010	2010 (SF>4 lots) & >2,500 sq ft/lot	No	2010, SF>5,000 sq ft	2000	Yes	No
ND2-Smart Irrigation Controller	2005	Yes	2010	2010	2010 (SF>4 lots) & >2,500 sq ft/lot	No	2010, SF>5,000 sq ft	2011	Yes	Yes
ND3- High Efficiency Toilets	2005	Yes	2009	2011	2011	No	No	2011	Yes	Yes
ND4- Dishwasher New Efficient	2005	No	2009	No	No	No	No	2012	Yes	No
ND5-Clothes Washing Machine Requirement	2000	No	2009	No	No	No	No	2011	Yes	No
ND6-Hot Water on Demand	No	No	No	No	No	No	No	No	No	No
ND7-High Efficiency Faucets and Showerheads	2006	Yes	2009	2011	2011	No	No	2011	Yes	Yes
ND8-Landscape and Irrigation Requirements	2004	2010 (State ordinance)	2010	SF since 2007. All other since 1993	2010 for landscapes > 2,500 sq ft (applies	2010 (adopted ordinance planned to	2010 for All except SF<5,000 sq. ft. and	1994	Yes	Yes

New Development (ND) Measure	NMWD	City of Rohnert Park ¹	City of Cotati ²	City of Santa Rosa	Town of Windsor	City of Sonoma	Valley of the Moon WD	Marin Municipal Water District	City of Petaluma	CALGreen Requirement
					to all but SF<5 lots)	be adopted September 1, 2010, budgets w/ 60% ET	turf<600 sq ft			
Urinals	2008	No	No	2011	2011	2009	No	2011	Yes	Yes
Source	NMWD Reg 15	Measure is mandatory under CALGreen. City adopted CALGreen effective January 2011.	Use Build it Green Checklist (Mandatory)	Adopting CALGreen 2010	Adopted WELO June 2010, CALGreen + Tier 1 January 2011	Use Build it Green Checklist (Mandatory)	County ordinance effective Jan 1, 2010	MMWD Title 13 Water Service Conditions	City ordinance 2009	State Reqmt; May take effect 2012

¹City of Rohnert Park has extensive green building ordinance requiring developers to select from a set of green building measures including some of the listed measures.

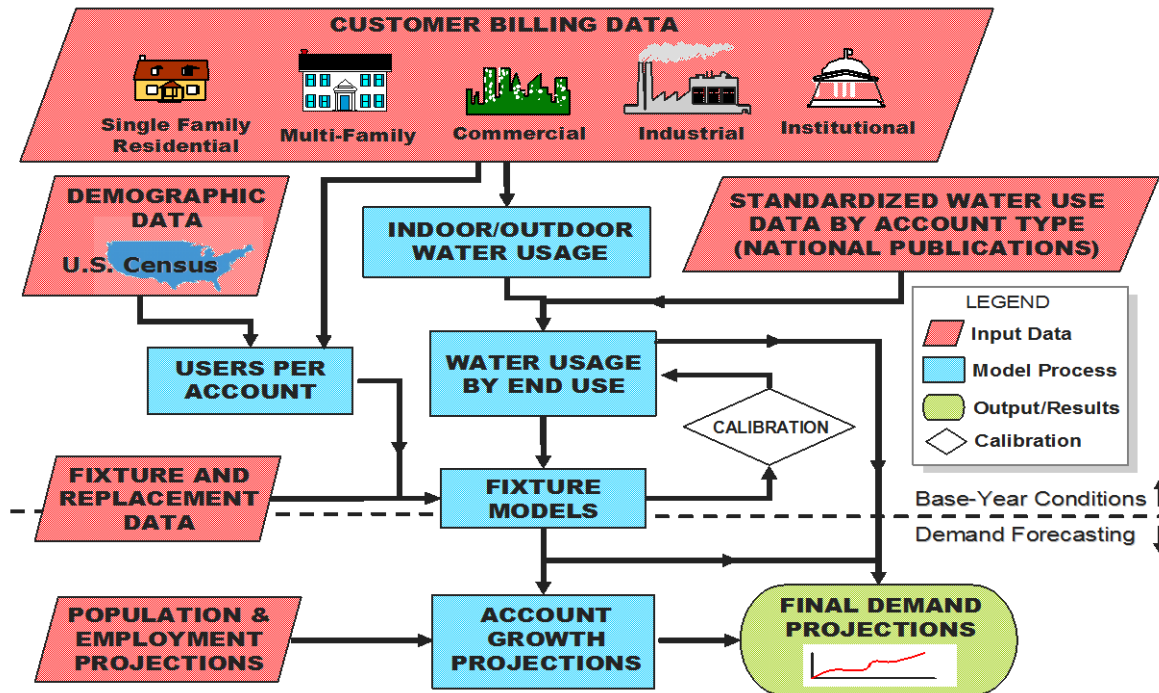
²City of Cotati ND-3 confirmed to start in 2009 based on July 27, 2010 with City of Cotati at the request of Damien O'Bid. Build It Green Checklist mandatory, beginning in the year 2004. The year 2009 was selected as a start date for 100% deployment of measures, as the measures can be selectively deployed providing the overall point minimum is achieved.

State Plumbing Code – AB 715

The Plumbing Code includes the new CCR Title 20 California State Law (AB 715) requiring High Efficiency Toilets and High Efficiency Urinals be exclusively sold in the state by 2014.

The following figure conceptually describes how the National plumbing code, CALGreen and AB 715 are incorporated into the flow of information in the DSS Model.

Figure A-1. DSS Model Overview Used to Make Potable Water Demand Projections



California State Law – SB 407

SB 407 (Plumbing Fixture Retrofit on Resale or Remodel): The DSS Model carefully takes into account the overlap with SB 407, the plumbing code (natural replacement), CALGreen, AB 715 and rebate programs (such as toilet rebates). SB 407 begins from the year 2017 in residential and 2019 in commercial properties. SB 407 program length is variable and continues until all the older high flush toilets have been replaced the service area. The number of accounts with high flow fixtures is tracked to make sure that the situation of replacing more high flow fixtures than actually exist does not occur.

DSS Model Fixture Replacement

The DSS Model is capable of modeling multiple types of fixtures, including fixtures with slightly different design standards. For example currently toilets can be purchased that can flush at a rate of 0.8 gallons per flush, 1.0 gallon per flush or 1.28 gallons per flush. The 1.6 gpf and higher gallons per flush toilets still exist but no longer can be purchased in California and cannot therefore be used for a replacement or new installation. So the DSS Model utilizes a fixture replacement table to decide what type of fixture is installed when a fixture is replaced or a new fixture is installed. The replacement of the fixtures is listed as a percentage as shown in the following figure. For example, a value of 100% would represent that all the toilets sold would be of one particular flush volume. A value of 75% means that three out of every four toilets installed would be of that particular flush volume type. The DSS Model contains a pair of replacement tables for each fixture type and customer category combination. For example, the DSS Model will contain a

pair of replacement tables for Residential Single Family toilets, Residential Multi-family toilets, Commercial toilets, Residential clothes washing machines, Commercial washing machines, etc.

Figure A-2. Example Toilet Replacement Percentages by Type of Toilet

Replacement Appliance Market Shares				
Year	1.28 gpf HET	1.6 gpf ULFT	High Use Toilet	Total
2012	75%	25%	0%	100%
2014	100%	0%	0%	100%
2020	100%	0%	0%	100%
2030	100%	0%	0%	100%
2050	100%	0%	0%	100%
New Appliance Market Shares				
Year	1.28 gpf HET	1.6 gpf ULFT	High Use Toilet	Total
2012	100%	0%	0%	100%
2014	100%	0%	0%	100%
2020	100%	0%	0%	100%
2030	100%	0%	0%	100%
2050	100%	0%	0%	100%

In the previous example, the DSS Model combines the effects of the following for the toilet fixture type:

- Federal Policy Act
 - Determines the “saturation” of 1.6 gpf toilets as it was in effect from 1992-2014 for toilet replacements.
- CALGreen
 - Determines that all “new appliance market share” toilets in “new” development will be 1.28 gpf
 - The year 2012 was selected as the beginning of the toilet portion of the code did not go into effect until July 1, 2011 and it also takes a while to get a permit, build the facility or residence, and have the toilets functioning with the building occupied, such that the savings would not actually occur until the year 2012 rather than the year 2011.
- AB 715
 - Determines that the “replacement appliance market” and “new appliance market” toilets will all be 1.28 gpf toilets or lower.

DSS Model Initial Fixture Proportions

The DSS Model also needs a place to start when it comes to fixture replacement. It needs to know what the initial proportions (or percentages) of each type of fixture that are currently installed (also known as fixture saturation rate) in the modeled service area for each customer class.

Figure A-3 presents an example of the initial proportions determined for residential toilets in the year 2010. In the following **example** the model started in 2010, therefore it is assumed the initial proportions of the 1.28 gallon per flush type toilets is 0% as they were not readily available at that time. Then using the 2010 DP-04 census data, which shows the age of houses in the service area, it is calculated that 39.3% of the total current homes were built since 1992 when 1.6 gallon per flush toilets were required to be installed in new homes. Then an average natural replacement rate (rate of broken or remodeled toilet) of 2.5% per year for higher flush volume toilets is assumed. Then, in this example, a 3.96% replacement rate is calculated due to a rebate program that was raising the replacement rate of toilets. This gives the initial proportion of 1.6 gallon per flush (gpf) toilets to be 90.0%, and 1.28 gpf toilets 3.3%. In this case the initial proportion of high flush toilets is assumed to be the remainder of 6.7%. This figure shows an example of a toilet fixture model and how it incorporates the changes from each of these legislative items. There are similar fixture models for showers, clothes washers, and urinals. There is one fixture model for each of the following categories:

- Single family toilets
- Multi-family toilets

- Commercial toilets
- Commercial urinals
- Single family showers
- Multi-family showers
- Single Family clothes washers
- Multi-family clothes washers

Figure A-3. Example Residential Toilet Initial Proportions from Fixture Analysis used for DSS Fixture Model

Fixture Model:		Residential Toilets				Comments	Replacement Data	
Appliance Data								
Fixture Type	Volume per Use (Gallons) ¹	Proportion of Homes by Age ²	Net Change due to Natural Replacement	Net Change due to Rebate Program ³	Initial Proportions ⁴		Fixture Type	Percent Annual Replacement ⁵
1.28 gal/flush High Efficiency Toilets (HET)	1.3	0.0%	0.0%	3.30%	3.3%	3.4% as these toilets were not very prevalent in the start year.	1.28 gal/flush High Efficiency Toilets (HET)	2.0%
1.6 gal/flush Ultra Low Flow Toilets (ULFT)	1.8	39.3%	50.0%	0.66%	90.0%	39.3% new homes since 1990 + 50% natural replacement +15% retrofit program	1.6 gal/flush Ultra Low Flow Toilets (ULFT)	2.0%
High Flush and 3.5 gal/flush	4.0	60.7%	-50.00%	-3.96%	6.7%	Remainder	High Flush and 3.5 gal/flush	2.5%
NOTES:								
1a. Volumes-per-use are based on average flush volumes for age of toilet. New toilets when out of adjustment flush at an average of 1.8 gpf instead of 1.6 gpf.								
1b. Initial proportions of fixtures installed in homes are based on the age of homes as provided in the 2010 Census.								
2. Assume homes constructed after 1992 installed ULFTs.								
3. Net change due to rebate program is based on historical active conservation activity.								
4. The initial proportions are fundamentally calculated by taking the initial proportions of homes by age (corresponding to efficiency levels) and adding the net change due to natural replacement and adding change due to rebate program minus the "free rider effect." No fixture % can exceed 90%.								
5a. Assume a 2.5% replacement rate for older toilets to the ULFTs over the 17 years since they where required.								
5b. Assume a future annual replacement rate of 2.0% for high efficiency fixtures, 2.0% for medium efficiency fixtures and 2.5% for low efficiency fixtures. 2.0% corresponds to a 50 year fixture life. 2.5% corresponds with a 40 year fixture life.								

These initial proportions determine in the fixture model and found in each Water Contractor's Water Use Data Analysis workbook, are then entered into the DSS Model for each fixture's "Codes and Standards" worksheet. A screenshot of the single family toilets codes and standards worksheet is shown in the following figure. Most DSS Models include fixture models for SF and MF toilets, showers, and clothes washers; and commercial toilets and urinals.

Figure A-4. Example Residential Toilet Fixture Screenshot from DSS Model

Single Family Toilets		
 Single Family Toilets Categories	General	
	Measure Category	Default Plumbing Code
	Start Year	2012
	Description	The DSS Model is capable of modeling multiple types of fixtures, including fixtures with slightly different design standards. For example currently toilets can be purchased that can flush at 1.28 gallons per flush or 1.6 gallons per flush. The higher flush toilets (3.5gpf) still exist but no longer can be purchased in California and cannot therefore be used for a replacement or new installation. The DSS Model utilizes a fixture replacement table to decide what type of toilet is installed when a fixture is replaced or a new fixture is installed. The replacement of the fixtures is listed as a percentage. For example, a value of 100% would represent that all the toilets sold would be of one particular flush volume. A value of 75% means that three out of every four toilets installed would be of that particular flush volume type. The DSS Model combines the effects of the following for the toilet fixture type: • Federal Policy Act: Determines the "saturation" of 1.6 gpf toilets as it was in effect from 1992-2014 for toilet replacements. • Cal Green: Determines that all "new appliance market share" toilets in "new" development will be 1.28 gpf. The year 2012 was selected for the model input as the toilet portion of the code did not go into effect until July 1, 2011 and it also takes a while to get a permit, build the facility or residence, and have the toilets functioning with the building occupied, such that the savings would not actually occur until the year 2012 rather than the year 2011. • AB 715: Determines that the "replacement appliance market" and "new appliance market" toilets will all be 1.28 gpf toilets. An additional input to the DSS Model is the natural replacement rate of fixtures due to breakage, remodeling or other reason for replacement over time. To do this the DSS Model uses a percentage value for each fixture type that becomes the assumed natural replacement rate for that fixture. For example, a natural replacement rate of 2.5% is used for older toilets. This value can be modified by the user as shown on the previous worksheet. Each year the number of remaining accounts with old toilets is calculated as 0.975 times the prior year's value.
	Comments	1. Volumes-per-use are based on average flush volumes for age of toilet. New toilets when out of adjustment flush at an average of 1.8 gpf instead of 1.6 gpf. 2. Initial proportions of fixtures installed in homes are based on the age of homes as provided in the 2010 Census. 3. Assume homes constructed after 1992 installed ULFTs. 4. Net change due to rebate program is based on historical active conservation activity. 5. The initial proportions are fundamentally calculated by taking the initial proportions of homes by age (corresponding to efficiency levels) and adding the net change due to natural replacement and adding change due to rebate program minus the "free rider effect." No fixture % can exceed 90%. 6. Assume a 2.5% replacement rate for older toilets to the ULFTs over the 17 years since they were required. 7. Assume a future annual replacement rate of 2.0% for high efficiency fixtures, 2.0% for medium efficiency fixtures and 2.5% for low efficiency fixtures. 2.0% corresponds to a 50 year fixture life. 2.5% corresponds with a 40 year fixture life.
	Customer Category	Single Family
	End Use	Toilets
	Effected Fixtures	
	1.28 gpf HET	☒
	1.6 gpf ULFT	☒
High Use Toilet	☒	
Initial Fixture Proportions		
1.28 gpf HET	2.7%	
1.6 gpf ULFT	90.0%	
High Use Toilet	7.3%	
Total	100.0%	

DSS Model Fixture Replacement Rates

An additional input to the DSS Model is the natural replacement rate of fixtures due to breakage, remodeling or other reason for replacement over time. To do this the DSS Model uses an percentage value for each fixture type that becomes the assumed natural replacement rate for that fixture. For example, high flush toilets have a replacement rate value of 2.5%. Each year the number of remaining accounts with old toilets is calculated as 0.975 times the prior year's value. This value can be modified by the user for any fixture as shown in Figure A-5 below.

Also included in the following figure are example fixture efficiencies, which can be adjusted to any desired level based on service area characteristics. MWM can update data on efficiency levels found in the field and the 2011 California Single Family Water Use Efficiency Study (Bill DeOreo) or other recent information related to fixture saturation rates.

Figure A-5. Example Future Replacement Rates of Fixtures from DSS Model

			Fixtures			
Fixture Name	End Use		Average Water Use	Units	Fixture Life (yrs)	Replacement Rate
1.28 gpf HET	Toilets	▼	1.30	gpf	50	2.0%
1.6 gpf ULFT	Toilets	▼	1.80	gpf	50	2.0%
High Use Toilet	Toilets	▼	3.50	gpf	40	2.5%
1 gpf Urinal	Urinals	▼	1.00	gpf	50	2.0%
0.5 gpf Urinal	Urinals	▼	0.50	gpf	50	2.0%
Waterless Urinal	Urinals	▼	0.00	gpf	50	2.0%
High Use Urinals	Urinals	▼	3.00	gpf	40	2.5%
Quart Urinals	Urinals	▼	0.25	gpf	50	2.0%
High Efficiency 2 gpm	Showers	▼	13.92	gal per use	25	4.0%
Low Flow 2.5 gpm	Showers	▼	18.27	gal per use	25	4.0%
High Flow > 3 gpm	Showers	▼	23.49	gal per use	25	4.0%
Efficient	Clothes Washers	▼	12.00	gal per use	10	10.0%
Medium Efficiency	Clothes Washers	▼	19.20	gal per use	10	10.0%
Top Loader	Clothes Washers	▼	34.20	gal per use	10	10.0%

DSS Model End Uses

Indoor and outdoor residential and non-residential end use breakdowns can be found in the “End Uses” section of each Water Contractor’s DSS Model on the “Breakdown” worksheet. As screenshot example of this worksheet is shown in Figure A-6. The source of these values is the California DWR Report "California Single Family Water Use Efficiency Study", 2011, AWWARF’s Report “Residential End Uses of Water” 2015 (pending), and Water Contractor supplied data on costs and savings. AWWARF’s 2000 "Commercial and Institutional End Uses of Water" is also used.

Figure A-6. End Use Breakdown Example Screenshot

Breakdown								
 Breakdown	Indoor							
	End Use Name	SF	MF	COM	IND	INST	IRR	OTH
	Toilets	16.0%	18.0%	16.5%	12.0%	18.0%		
	Urinals			4.0%	3.0%	5.0%		
	Faucets	21.0%	12.0%	13.0%	14.0%	14.0%		
	Showers	24.0%	28.0%	8.0%	8.0%	8.0%		
	Dishwashers	2.0%	5.0%	6.0%	6.0%	6.0%		
	Clothes Washers	13.0%	16.5%	15.0%	15.0%	15.0%		
	Process			23.0%	27.0%			
	Kitchen Spray Rinse			5.0%	5.0%	5.0%		
	Internal Leakage	7.0%	5.0%	9.5%	10.0%	10.0%		
	Baths	2.5%	1.5%					
	Other	14.5%	14.0%	0.0%	0.0%	19.0%		
	Total	100.0%	100.0%	100.0%	100.0%	100.0%	0.0%	0.0%
	Outdoor							
	End Use Name	SF	MF	COM	IND	INST	IRR	OTH
	Irrigation	80.0%	83.0%	95.0%	95.0%	95.0%	95.0%	
	Pools	1.0%	2.0%					
	Wash Down	7.0%	4.0%					
	Car Washing	7.0%	4.0%					
	External Leakage	5.0%	7.0%	5.0%	5.0%	5.0%	5.0%	5.0%
	Outdoor							95.0%
	Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

End use breakdown values will differ slightly between Water Contractors due to differing demographics of their service area population. Residential frequency of use information for toilets, showers, and washers, and non-residential frequency of use of toilets and urinals is included in the “Codes and Standards” green section on the “Fixtures” worksheet of each Water Contractor’s DSS Model, and then confirmed in each “Service Area Calibration End Use. Calculated frequencies of use in uses/user/day for customer end uses are presented in each customer category’s “Service Area Calibration End Use” worksheet and compared to an industry-accepted use range based on AWWARF’s residential, commercial and institutional end use reports mentioned previously. An example of this calibration sheet is shown in the screenshot in Figure A-7 below.

Figure A-7. Single Family End Use Breakdown and Fixture Use Frequency Example Screenshot

Single Family							
 Single Family	End Use	Use Percentage	Uses/User/Day	Lower	Upper	State	Fixture Model
	Toilets	16.0%	4.76	4.5	5.6	Calibrated	Edit
	Faucets	21.0%					
	Showers	24.0%	0.73	0.6	0.9	Calibrated	Edit
	Dishwashers	2.0%					
	Clothes Washers	13.0%	0.32	0.3	0.42	Calibrated	Edit
	Internal Leakage	7.0%					
	Baths	2.5%					
	Other	14.5%					
	Total	100.0%					

A.2 Present Value Parameters

Present value analysis using constant FY 2014 dollars and a real discount rate of 3% is used to discount costs and benefits to the base year. From this analysis, benefit-cost ratios of each measure are computed. When measures are put together in programs, the model is set up to avoid double counting savings from multiple measures that act on the same end use of water. For example, multiple measures in a program may target toilet replacements. The model includes assumptions to apportion water savings between the multiple measures.

Economic analysis can be performed from several different perspectives, based on which party is affected. For planning water use efficiency programs for utilities, the perspectives most commonly used for benefit-cost analyses are the “utility” perspective and the “community” perspective. The “utility” benefit-cost analysis is based on the benefits and costs to the water provider. The “community” benefit-cost analysis includes the utility benefit and costs together with account owner/customer benefits and costs. These include customer energy and other capital or operating cost benefits plus costs of implementing the measure, beyond what the utility pays.

The utility perspective offers two advantages. First, it considers only the program costs that will be directly borne by the utility. This enables the utility to fairly compare potential investments for saving versus supplying increased quantities of water. Second, revenue shifts are treated as transfer payments, which means program participants will have lower water bills and non-participants will have slightly higher water bills so that the utility’s revenue needs continue to be met. Therefore, the analysis is not complicated with uncertainties associated with long-term rate projections and retail rate design assumptions. It should be noted that there is a significant difference between the utility’s savings from the avoided cost of procurement and delivery of water and the reduction in retail revenue that results from reduced water sales due to water use efficiency. This budget impact occurs slowly, and can be accounted for in water rate planning. Because it is the water provider’s role in developing a water use efficiency plan that is vital in this study, the utility perspective was primarily used to evaluate elements of this report.

The community perspective is defined to include the utility and the customer costs and benefits. Costs incurred by customers striving to save water while participating in water use efficiency programs are considered, as well as the benefits received in terms of reduced energy bills (from water heating costs) and wastewater savings, among others. Water bill savings are not a customer benefit in the aggregate for reasons described above. Other factors external to the utility, such as environmental effects, are often difficult to quantify or are not necessarily under the control of the utility. They are therefore frequently excluded from economic analyses, including this one.

The time value of money is explicitly considered. Typically the costs to save water occur early in the planning period whereas the benefits usually extend to the end of the planning period. A long planning period of 30-40 years is typically used because costs and benefits that occur beyond 2050 years have very little influence on the total present value of the costs and benefits. The value of all future costs and benefits is discounted to the first year in the DSS Model (the base year, which in this case is 2015), at the real interest rate of 3.01%. The DSS Model calculates this real interest rate, adjusting the current nominal interest rate (assumed to be approximately 6.1%) by the assumed rate of inflation (3.0%). The formula to calculate the real interest rate is: $(\text{nominal interest rate} - \text{assumed rate of inflation}) / (1 + \text{assumed rate of inflation})$. Cash flows discounted in this manner are herein referred to as “Present Value” sums.

A.3 Assumptions about Measure Costs

Costs were determined for each of the measures based on industry knowledge, past experience and data provided by the individual Water Contractors. Costs may include incentive costs, usually determined on a per-participant basis; fixed costs, such as marketing; variable costs, such as the costs to staff the measures and to obtain and maintain equipment; and a one-time set-up cost. The set-up cost is for measure design by staff or consultants, any required pilot testing, and preparation of materials that will be used in marketing the measure. The model was run for 36 years (each year between FY 2014 and FY 2050). Costs were spread over the time period depending on the length of the implementation period for the measure and estimated voluntary customer participation levels.

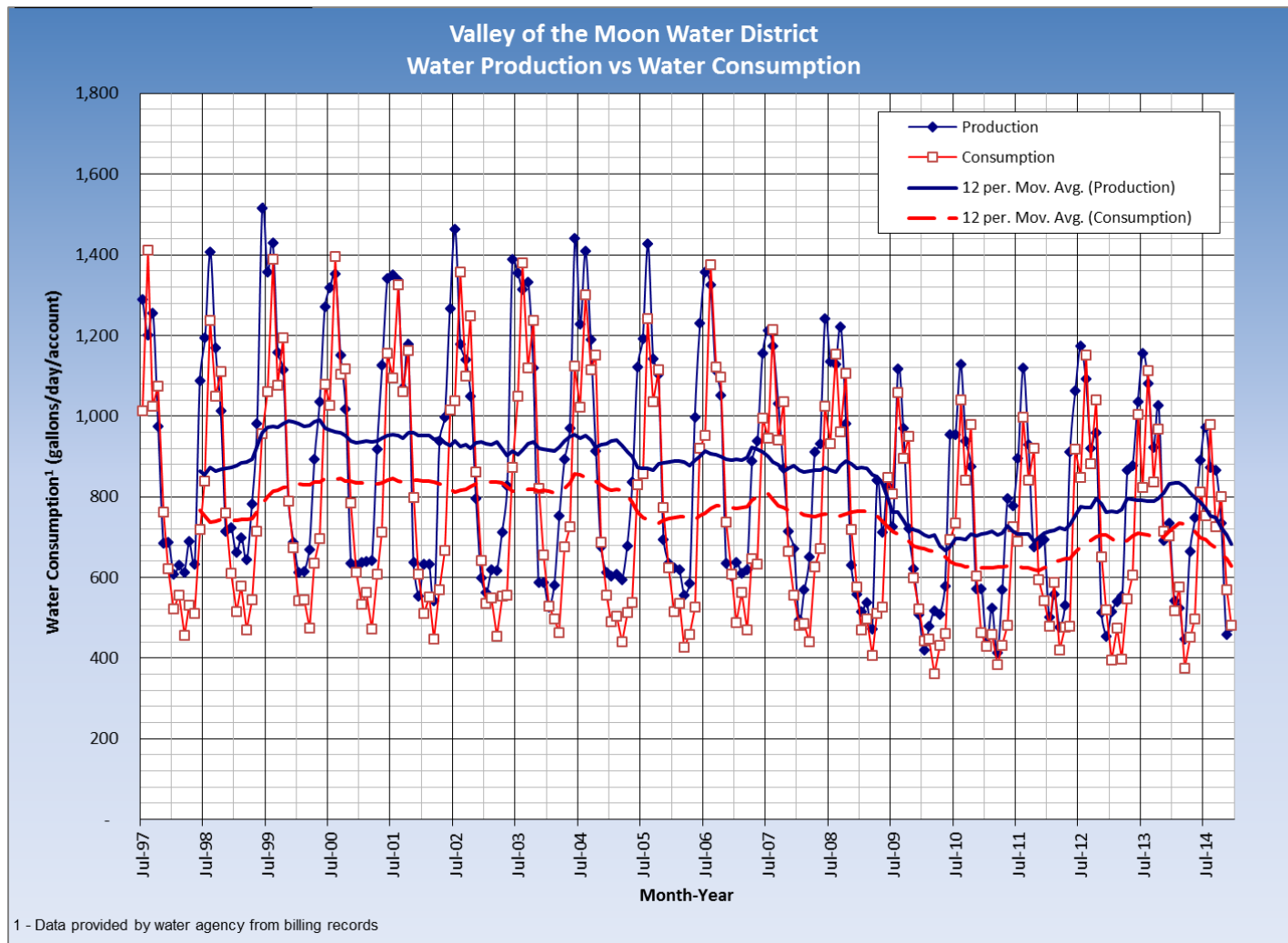
Lost revenue due to reduced water sales is not included as a cost because the water use efficiency measures evaluated herein generally take effect over a long span of time that is sufficient to enable timely rate adjustments, if necessary, to meet fixed cost obligations and savings on variable costs such as energy and chemicals.

A.4 Assumptions about Measure Savings

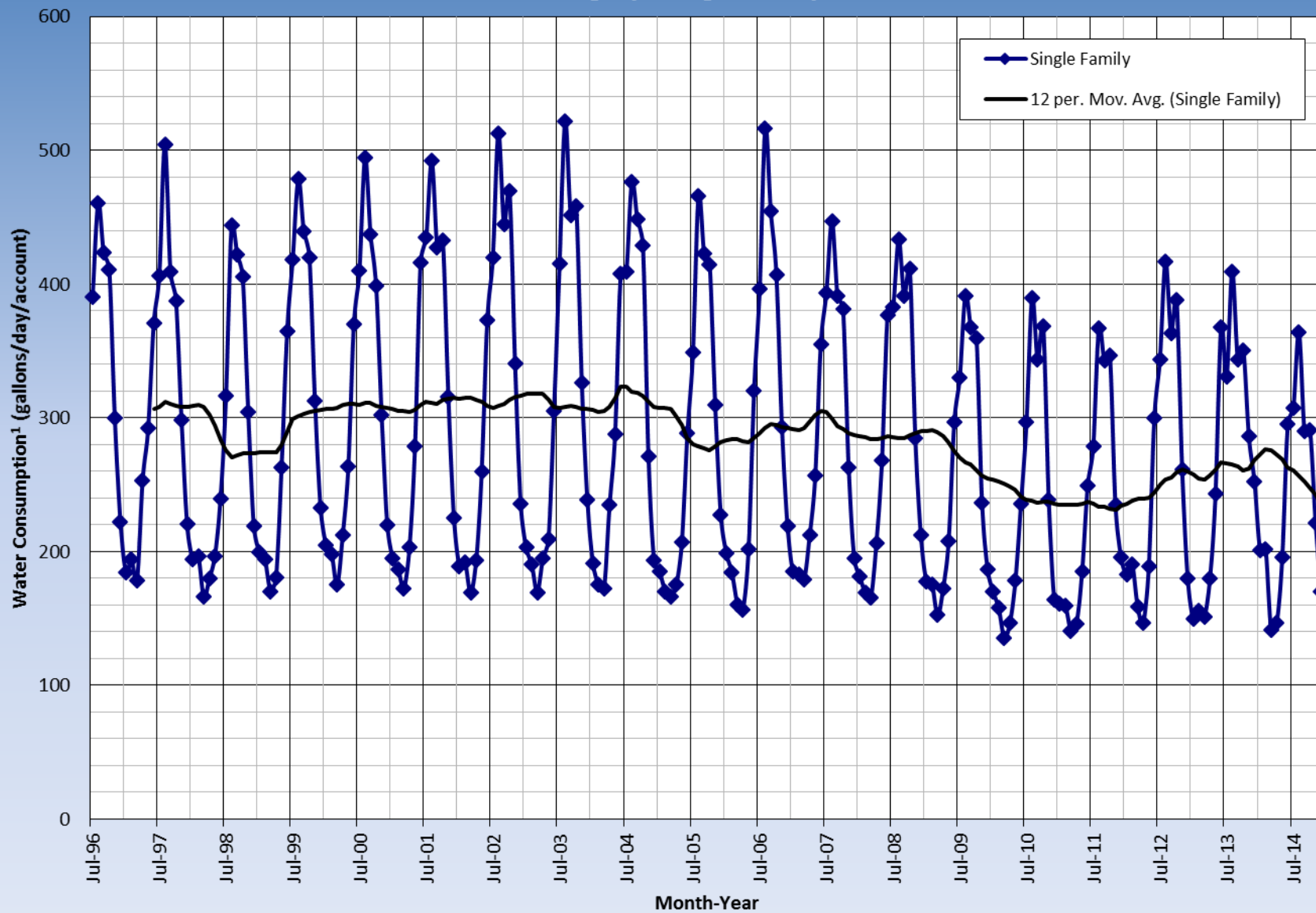
Data necessary to forecast water savings of measures include specific data on water use, demographics, market penetration, and unit water savings. Savings normally develop at a measured and predetermined pace, reaching full maturity after full market penetration is achieved. This may occur three to seven years after the start of implementation, depending upon the implementation schedule. For every water use efficiency activity or replacement with more efficient devices, there is a useful life. The useful life is called the “Measure Life” and is defined to be how long water use efficiency measures stay in place and continue to save water. It is assumed that measures implemented because of codes, standards or ordinances, like toilets for example, would be “permanent” and not revert to an old inefficient level of water use if the device needed to be replaced. However, some measures that are primarily behavioral based, such as residential surveys, are assumed to need to be repeated on an ongoing basis to retain the water savings (e.g., homeowners move away and new homeowners may have less efficient water using practices around the home). Surveys typically have a measure life on the order of five years.

APPENDIX B - WATER USE GRAPHS FOR PRODUCTION AND CUSTOMER CATEGORIES

As initially presented in Section 3 of this report, this appendix presents historical customer category water use graphs. Units shown are average gallons of water per account per day. These graphs were reviewed to better identify outlier data points and years so that a representative baseline water use value (of average account water use by category) could be determined. The effects of drought, economic recessions, service line failures, and meter inaccuracies are typically evident in these figures.

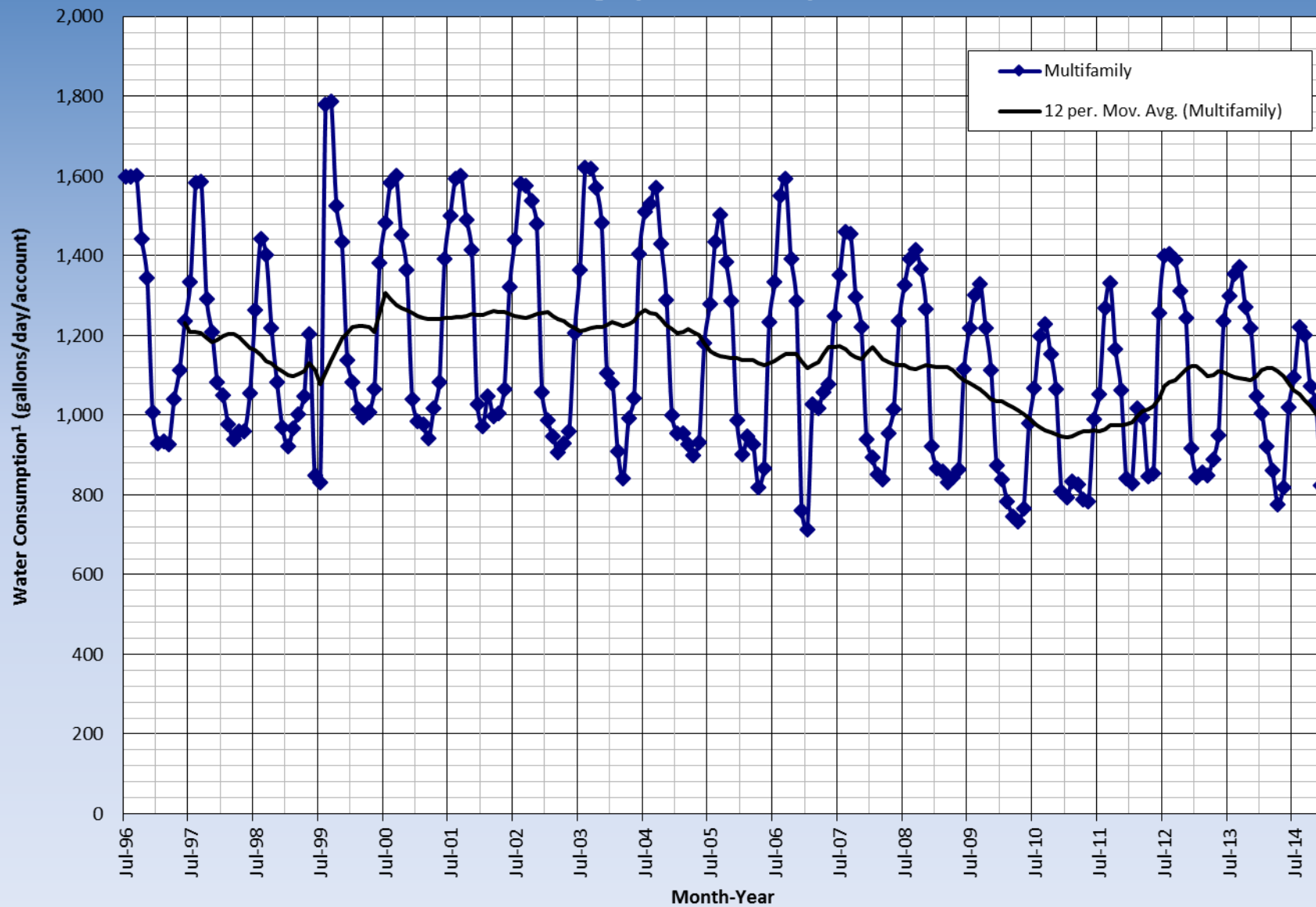


Valley of the Moon Water District
Customer Category : Single Family Residential

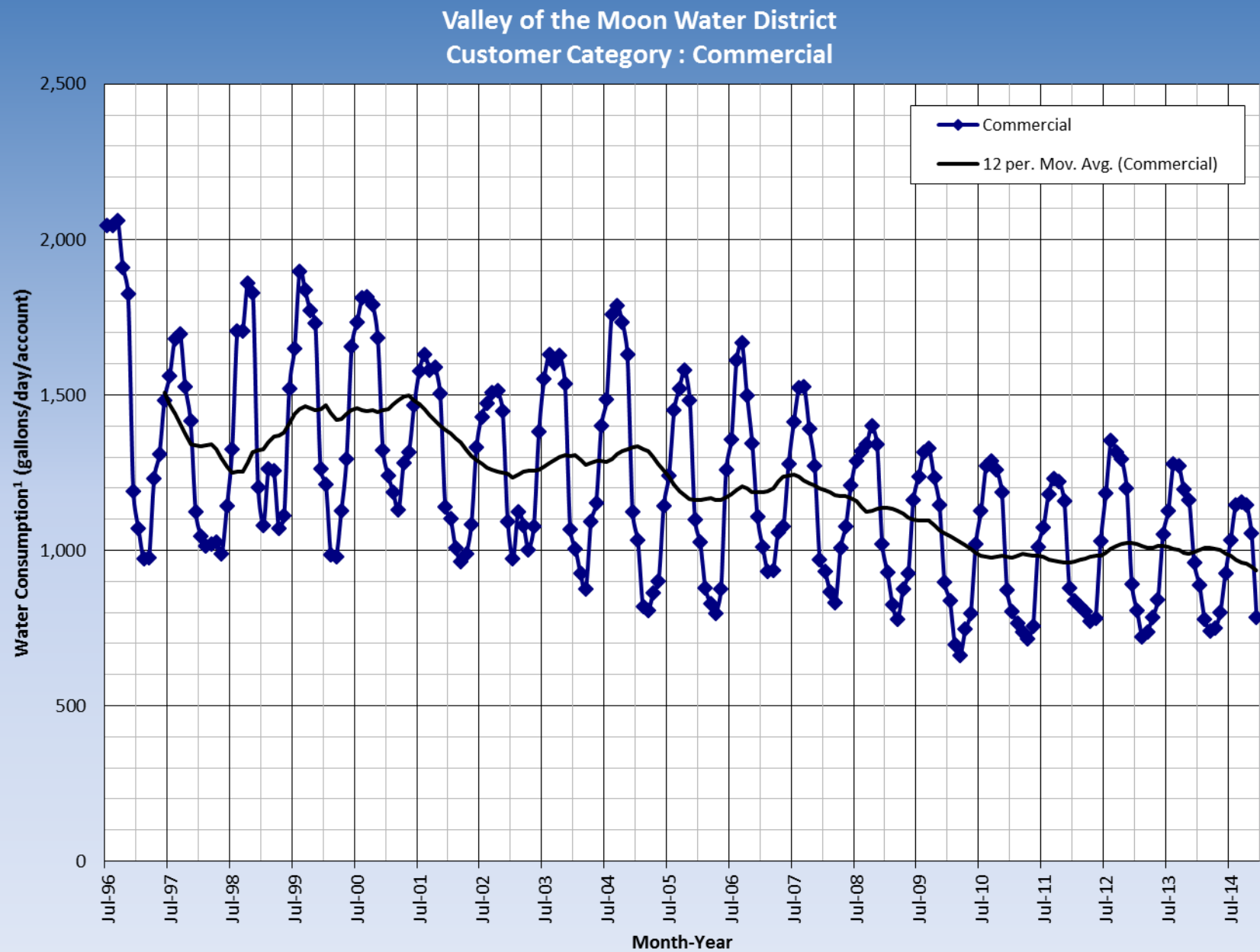


1 - Data provided by water agency from billing records

Valley of the Moon Water District
Customer Category : Multi Family Residential

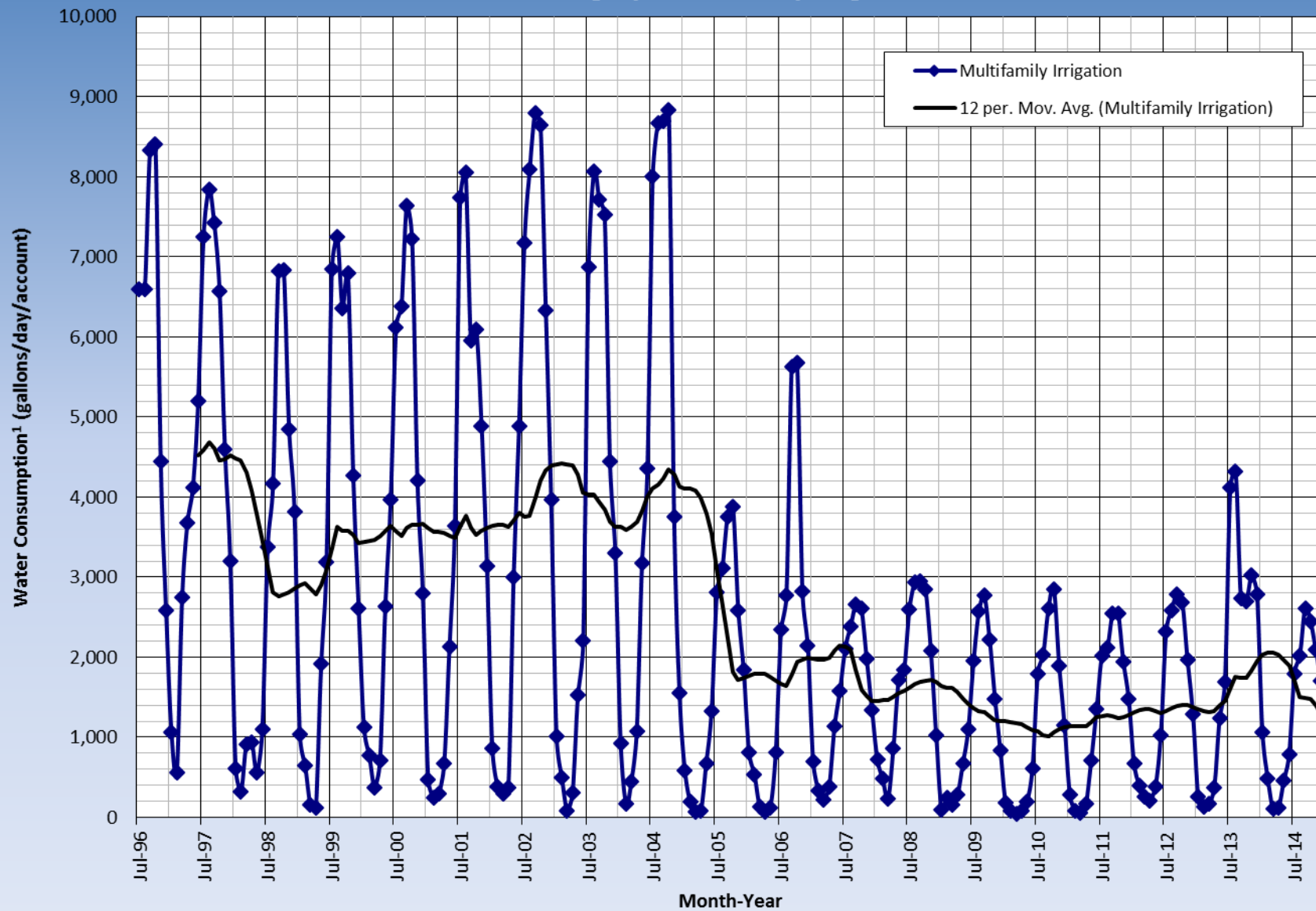


1 - Data provided by water agency from billing records



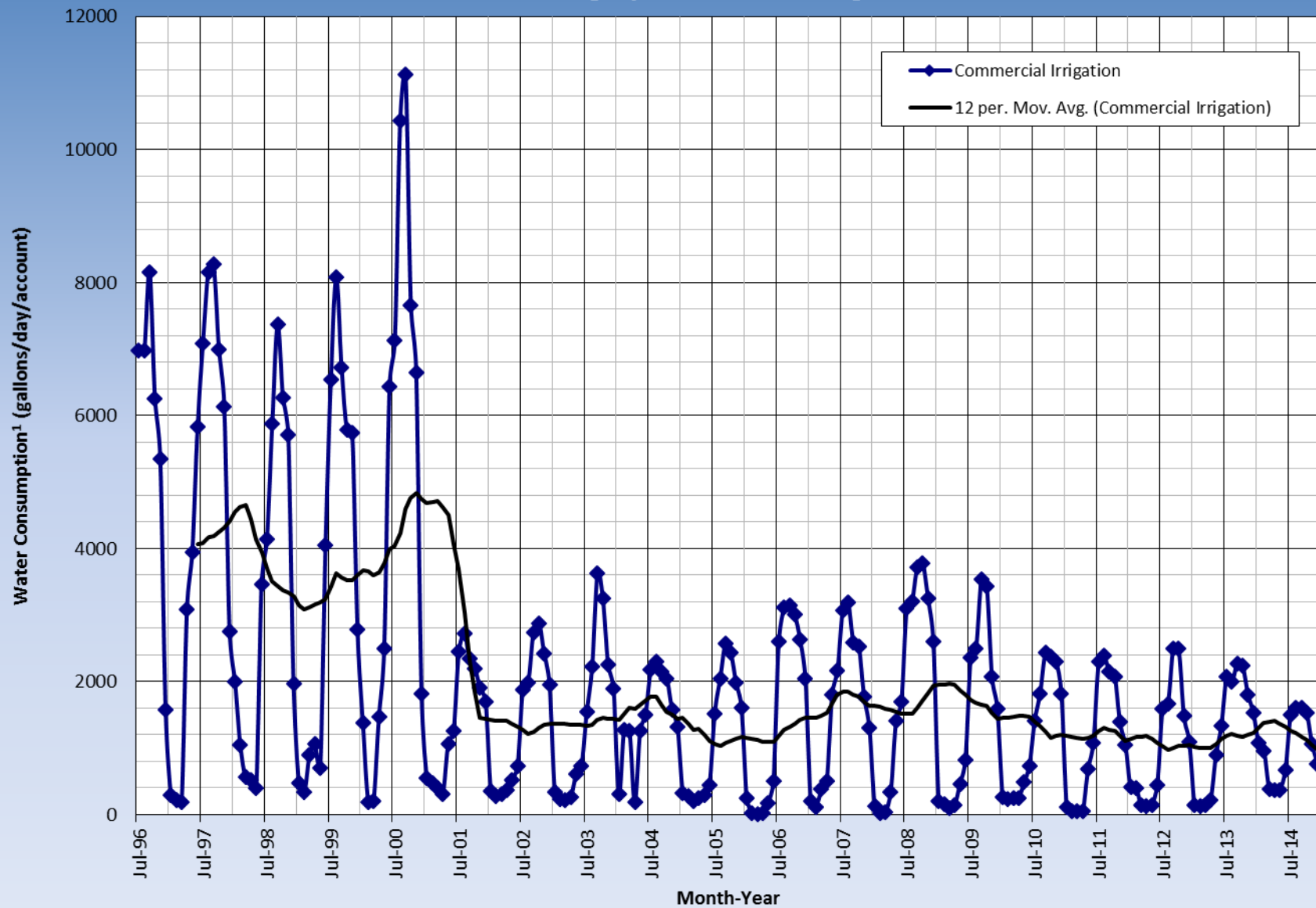
1 - Data provided by water agency from billing records

Valley of the Moon Water District Customer Category : Multifamily Irrigation

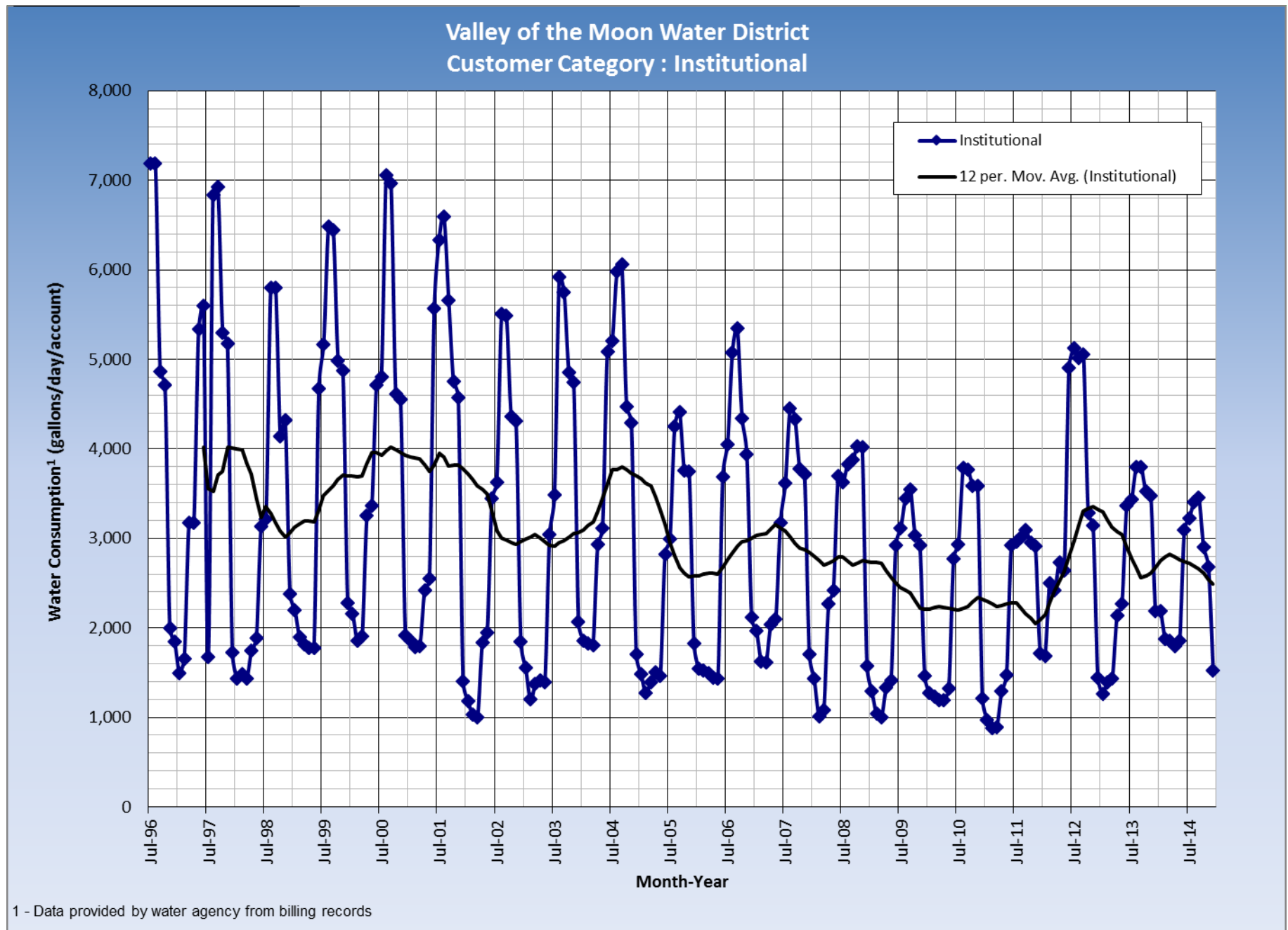


1 - Data provided by water agency from billing records

Valley of the Moon Water District Customer Category : Commercial Irrigation



1 - Data provided by water agency from billing records



APPENDIX C - MEASURE SCREENING PROCESS AND RESULTS

In order to start the cost effectiveness analysis and build a water use efficiency model for each Water Contractor, the SMSWP Water Contractors decided on the list of conservation measures to be analyzed that, once modeled, would serve as the menu to build conservation program scenarios. To this end, two web-based webinars were conducted in February and March 2015 to review and select conservation measures together with staff representatives from each Water Contractor. The library of conservation measure opportunities had more than 50 measures and various implementation strategies (having different unit costs, participation levels and/or unit water savings which must be modeled individually). In order to maximize efficiency and productivity at the workshop, each Water Contractor developed two “top 10” lists of active conservation measures that they wanted to evaluate in order to eventually decide if their Water Contractor would include the measure in their DSS Model:

1. *Regional “Top 10” list* – a suite of measures each Water Contractor wanted to be analyzed for the SMSWP to implement.
2. *Water Contractor “Top 10” list* – a suite of measures that each Water Contractor representative selected for their own Water Contractor to possibly implement individually without SMSWP support.

Furthermore, to help facilitate input and combine results most easily, each Water Contractor completed an online survey to help identify their ideal “top 10” potential conservation measures for both the regional and Water Contractor programs. Water Contractors collaborated internally with others in their Water Contractor as necessary. The results of the survey were treated as the input from each Water Contractor’s perspective.

Based on this initial Water Contractor input, subsequent workshop calls were structured to focus on a discussion of measures that received mixed interest from the group, rather than those measures that the group already had consensus on. This approach led to a decision on which measures should initially be included in the DSS Models. Additionally, each Water Contractor also had the ability to add unique measures for their individual DSS Model.

Once finalized, the selected measures on both the SMSWP-led and Water Contractor-led lists were inserted into each Water Contractor’s DSS Model, along with the standard utility operations (e.g., water loss control programs) and education measures in order to have a complete standard menu of 25 measures in each Water Contractor’s DSS Model. Next, the Project Team worked with each Water Contractor to more specifically analyze measures (participation rates, Water Contractor unit costs and unit water savings, etc.), and build conservation program scenarios. The number of measures, twenty-five, comes from the consultant’s past experience on having enough measures to choose from to (a) build program scenarios that are able to meet SB X7-7 water use targets, and (b) still be feasible to be successfully implemented between SMSWP and Water Contractor combined efforts.

The following figures present the regional and Water Contractor measure rankings resulting from this screening process. Measures with the highest priority for being included in the cost effectiveness analysis were ranked with number 1 representing the most important. Note that selections for the top 1-5 measures likely “passed” the screening; measures showing ranking 5-10 received the most debate at the workshop.

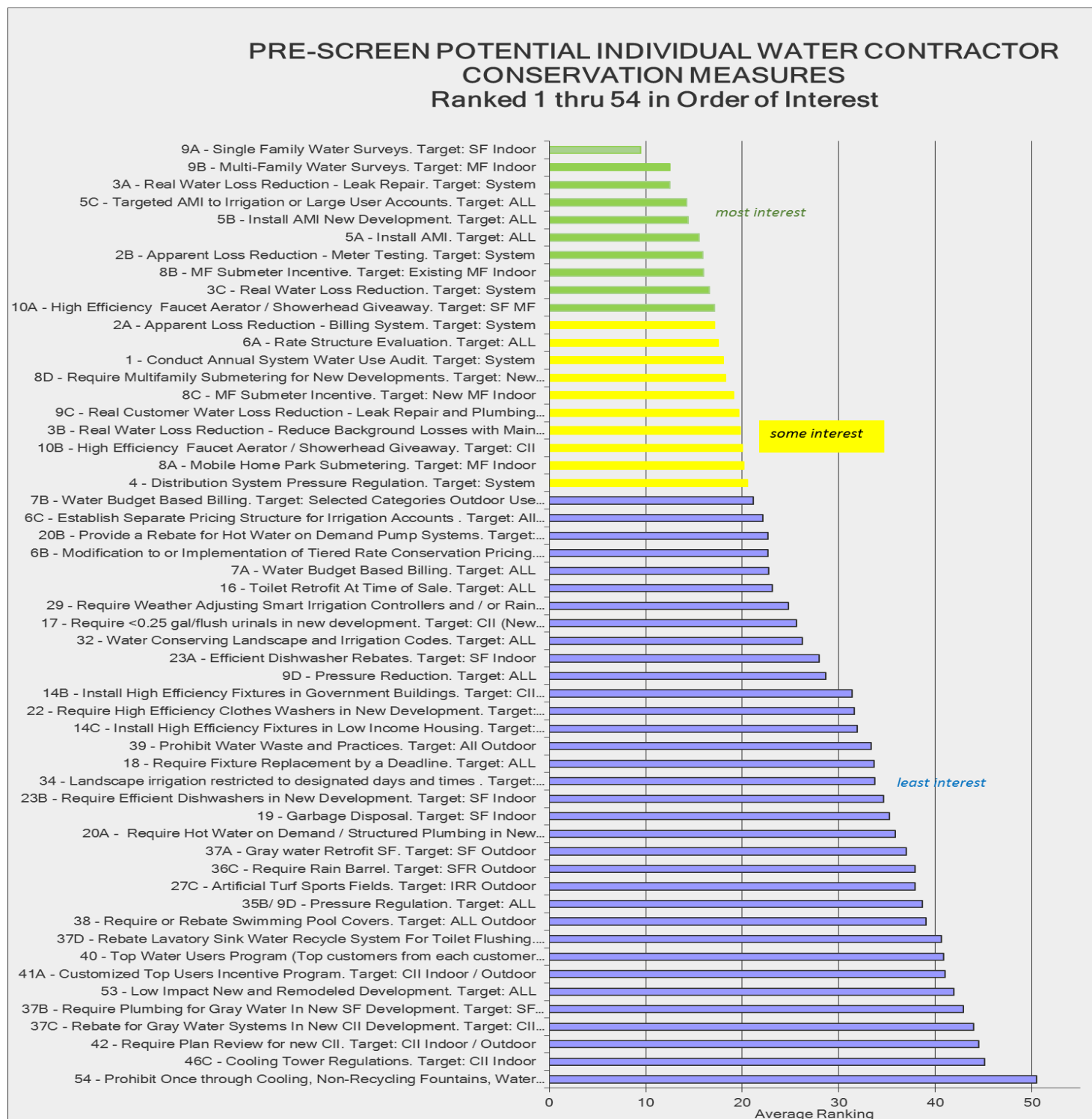
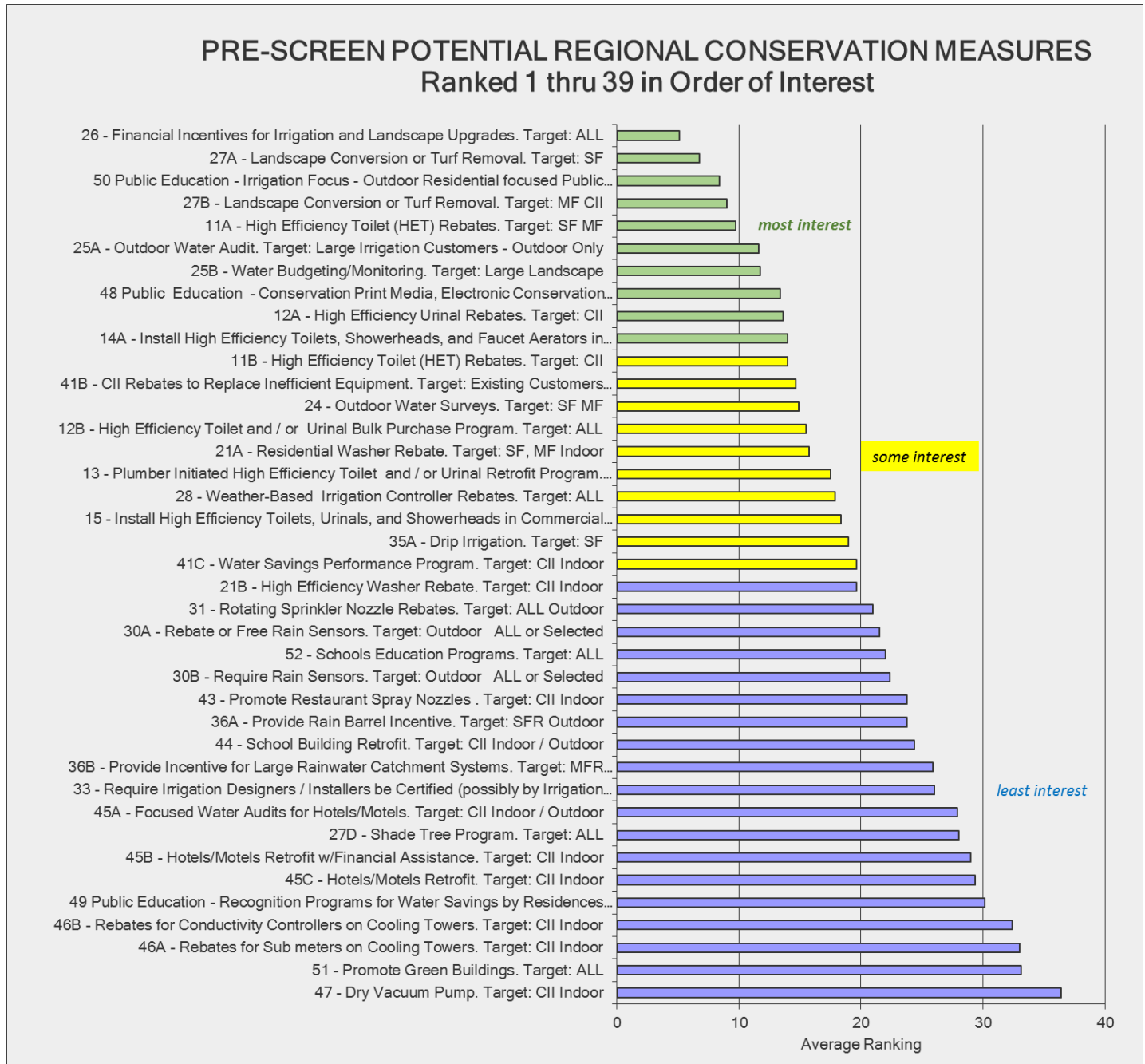
Figure C-1. Water Contractor-Only Measures Screening Ranking

Figure C-2. Regional Measures Screening Ranking

The general discussion screening criteria included:

- **Technology/Market Maturity** – Refers to whether the technology needed to implement the water use efficiency measure, such as an irrigation control device, is commercially available and supported by the local service industry. A measure was more likely to be included if the technology was widely available in the service area and less likely to be included if the technology was not commercially available or not supported by the local service industry.
- **Service Area Match** – Refers to whether the measure or related technology is appropriate for the area's climate, building stock, and lifestyle. For example, promoting native and/or water efficient landscaping may not be appropriate where water use analysis indicates little outdoor irrigation. Thus, a measure was not included if it

was not well suited for the area's characteristics and could not save water; and was more highly considered to be included if it was well suited for the area and could save water.

- **Customer Acceptance/Equity** – Refers to whether retail customers within the service area would be willing to implement and accept the water use efficiency measures. For example, would retail customers attend homeowner irrigation classes and implement lessons learned from these classes? If not, then the water savings associated with this measure would not be achieved and a measure with this characteristic would score low for this criterion. This criterion also considers retail customer equity where one category of retail customers receives benefit while another pays the costs without receiving benefits. Retail customer acceptance may be based on convenience, economics, perceived fairness, and/or aesthetics.

Based on the survey results and previously listed criteria, MWM and Water Contractor staff decided if a measure was a “Yes” or “No”. Measures with a “No” were eliminated from further consideration, while those with a “Yes” passed into the next evaluation phase: cost-effectiveness analysis using the DSS Model.

Below was the schedule of measure screening tasks:

- January 2015 - Survey Monkey survey #1 distributed
- February 2015 – Screening web-based workshop with Water Contractors and SMSWP and SCWA representatives
- February 2015 - Survey Monkey survey #2 distributed
- March 2015 – Screening web-based workshop call with Water Contractors and SMSWP and SCWA representatives
- March 2015 – Measure list finalized

This appendix presents various parameter inputs as well as cost and savings results for the conservation measures evaluated in the Water Contractor's DSS Model. Annual utility costs, targets, and water savings were provided for each individual measure for the first 5 years to the year 2020. The actual DSS Model runs measures to the year 2040.

68



AMI

Overview	
Name	AMI
Abbr	2
Category	
Measure Type	Standard Measure

Time Period	Measure Life
First Year	2016
Last Year	2020
Measure Length	5
	Permanent ☒

Fixture Costs			
	Utility	Customer	Fix/Acct
SF	\$180.00	\$0.00	1
MF	\$180.00	\$0.00	2
COM	\$180.00	\$0.00	3
IRRMF	\$180.00	\$0.00	2
IRR	\$180.00	\$0.00	3

Administration Costs	
Markup Percentage	40%

Description

CONTRACTOR MEASURE: Retrofit system with AMI meters and associated network capable of providing continuous consumption data to Utility offices. Improved identification of system and customer leaks is a major conservation benefit. Some costs of these systems are offset by operational efficiencies and reduced staffing, as regular meter reading and opening and closing accounts are accomplished without the need for a site visit. Also enables enhanced billing options and ability to monitor unauthorized usage, such as use/tampering with closed accounts or irrigation when time of day or days per week are regulated. Customer service is improved as staff can quickly access continuous usage records to address customer inquiries. Optional features include online customer access to their usage, which has been shown to improve accountability and reduce water use. A five-year change-out would be a reasonable objective and may take longer if coupled with a full meter replacement program (on the order of 10 years). Require that new, larger or irrigation customers install such AMI meters as described above and possibly purchase means of viewing daily consumption inside their home, business, or by their landscape/property managers, either through the Internet (if available) or separate device. The AMI system would, on demand, indicate to the customer and Utility where and how their water is used, facilitating water use reduction and prompt leak identification. This would require Utility to install an AMI system.

Costs			
	Utility	Customer	Total
2015	\$0	\$0	\$0
2016	\$194,280	\$0	\$194,280
2017	\$195,402	\$0	\$195,402
2018	\$196,524	\$0	\$196,524
2019	\$197,646	\$0	\$197,646
2020	\$198,768	\$0	\$198,768

Customer Classes					
	SF	MF	COM	IRRMF	IRR
	☒	☒	☒	☒	☒

End Uses					
	SF	MF	COM	IRRMF	IRR
Toilets	☒	☒	☒	☒	☒
Urinals	☒	☒	☒	☒	☒
Faucets	☒	☒	☒	☒	☒
Showers	☒	☒	☒	☒	☒
Dishwashers	☒	☒	☒	☒	☒
Clothes Washers	☒	☒	☒	☒	☒
Process	☒	☒	☒	☒	☒
Kitchen Spray Rinse	☒	☒	☒	☒	☒
Internal Leakage	☒	☒	☒	☒	☒
Baths	☒	☒	☒	☒	☒
Other	☒	☒	☒	☒	☒
Irrigation	☒	☒	☒	☒	☒
Pools	☒	☒	☒	☒	☒
Wash Down	☒	☒	☒	☒	☒
Car Washing	☒	☒	☒	☒	☒
External Leakage	☒	☒	☒	☒	☒
Outdoor	☒	☒	☒	☒	☒
Cooling	☒	☒	☒	☒	☒

Comments

Basis for the starting value cost estimate is \$980,000 based on Valley of the Moon data without including the cost of the meters. This is a 5 year project with a pilot starting in 2015.

Results	
Average Water Savings (mgd)	0.045935
Lifetime Savings - Present Value (\$)	
Utility	\$1,340,891
Community	\$1,340,891
Lifetime Costs - Present Value (\$)	
Utility	\$899,469
Community	\$899,469
Benefit to Cost Ratio	
Utility	1.49
Community	1.49
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$2,062

End Use Savings Per Replacement	
	% Savings per Account
SF Internal Leakage	20.0%
SF Irrigation	5.0%
SF External Leakage	20.0%
MF Internal Leakage	20.0%
MF Irrigation	5.0%
MF External Leakage	20.0%
COM Internal Leakage	20.0%
COM Irrigation	5.0%
COM External Leakage	20.0%
IRRMF Internal Leakage	20.0%
IRRMF Irrigation	5.0%
IRRMF External Leakage	20.0%
IRR Internal Leakage	20.0%
IRR Irrigation	5.0%
IRR External Leakage	20.0%

Targets	
Target Method	Percentage
% of Accts Targeted / yr	10.000%
Only Effects New Accts	☒

Targets						
	SF	MF	COM	IRRMF	IRR	Total
2015	0	0	0	0	0	0
2016	625	44	17	2	1	689
2017	629	44	17	2	1	693
2018	632	44	17	2	1	697
2019	636	45	17	2	1	701
2020	639	45	17	2	1	705

Water Savings (mgd)	
Total Savings (mgd)	
2015	0.000000
2016	0.010272
2017	0.020603
2018	0.030994
2019	0.041444
2020	0.051953

70



Public Info & School Education -

Overview			
Name	Public Info & School Education		
Abbr	4		
Category	Standard Measure		
Measure Type	Standard Measure		

Time Period	
First Year	2015
Last Year	2040
Measure Length	26

Measure Life	
Permanent	☐
Years	2
Repeat	☐

Fixture Costs			
	Utility	Customer	Fix/Acct
SF	\$3.00	\$0.00	1

Administration Costs	
Markup Percentage	15%

Description	
REGIONAL MEASURE: Continue with regional public information and school education campaign. School education includes: school assembly program, classroom presentations, other options for school education.	

Customer Classes						
	SF	MF	COM	IRRMF	IRR	INST
	☒	☐	☐	☐	☐	☐

End Uses						
	SF	MF	COM	IRRMF	IRR	INST
Toilets	☒	☐	☐	☐	☐	☐
Urinals	☐	☐	☐	☐	☐	☐
Faucets	☒	☐	☐	☐	☐	☐
Showers	☒	☐	☐	☐	☐	☐
Dishwashers	☒	☐	☐	☐	☐	☐
Clothes Washers	☒	☐	☐	☐	☐	☐
Process	☐	☐	☐	☐	☐	☐
Kitchen Spray Rinse	☐	☐	☐	☐	☐	☐
Internal Leakage	☒	☐	☐	☐	☐	☐
Baths	☒	☐	☐	☐	☐	☐
Other	☐	☐	☐	☐	☐	☐
Irrigation	☒	☐	☐	☐	☐	☐
Pools	☒	☐	☐	☐	☐	☐
Wash Down	☒	☐	☐	☐	☐	☐
Car Washing	☒	☐	☐	☐	☐	☐
External Leakage	☒	☐	☐	☐	☐	☐
Outdoor	☐	☐	☐	☐	☐	☐
Cooling	☐	☐	☐	☐	☐	☐

Comments	
Cost assumes SF category but impacts all customer classes. SMWSP public info budget of \$160,000 annually for all water contractors is spent on QWEL, Water Wise Gardening Online, Garden Sense, and the Eco-Friendly Garden Tour. Based on 153,770 single family accounts for water contractors in 2014, the expenditures per SF account is approximately \$1.00. SMWSP school education is \$300,000 per year for all the water contractors which equates to \$2.00 per account. The education annual budget is for 20,000 students and 24,000 curriculum materials distributed. In summary, the total cost of \$3.00 per SF account includes \$1.00 for public information and \$2.00 per SF account for school education.	

Results	
Average Water Savings (mgd)	0.008713
Lifetime Savings - Present Value (\$)	
Utility	\$264,572
Community	\$391,552
Lifetime Costs - Present Value (\$)	
Utility	\$205,860
Community	\$205,860
Benefit to Cost Ratio	
Utility	1.29
Community	1.90
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$2,488

End Use Savings Per Replacement	
	% Savings per Account
SF Toilets	0.5%
SF Faucets	0.5%
SF Showers	0.5%
SF Dishwashers	0.5%
SF Clothes Washers	0.5%
SF Baths	0.5%
SF Internal Leakage	0.5%
SF Irrigation	0.5%
SF Pools	0.5%
SF Wash Down	0.5%
SF Car Washing	0.5%
SF External Leakage	0.5%

Targets	
Target Method	Percentage
% of Accts Targeted / yr	50.000%
Only Effects New Accts	☐

Costs			
	Utility	Customer	Total
2015	\$10,721	\$0	\$10,721
2016	\$10,783	\$0	\$10,783
2017	\$10,844	\$0	\$10,844
2018	\$10,906	\$0	\$10,906
2019	\$10,968	\$0	\$10,968
2020	\$11,030	\$0	\$11,030

Targets		
	SF	Total
2015	3,107	3,107
2016	3,125	3,125
2017	3,143	3,143
2018	3,161	3,161
2019	3,179	3,179
2020	3,197	3,197

Water Savings (mgd)	
	Total Savings (mgd)
2015	0.004371
2016	0.008750
2017	0.008784
2018	0.008818
2019	0.008853
2020	0.008889



Public Info & School Education -

Overview			
Name	Public Info & School Education		
Abbr	5		
Category			
Measure Type	Standard Measure		

Time Period		Measure Life	
First Year	2015	Permanent	☐
Last Year	2040	Years	2
Measure Length	26	Repeat	☐

Fixture Costs			
	Utility	Customer	Fix/Acct
SF	\$10.00	\$0.00	1

Administration Costs	
Markup Percentage	15%

Description
CONTRACTOR MEASURE: Public information dissemination and school education initiatives beyond those conducted by SMWSP.

Customer Classes						
	SF	MF	COM	IRRMF	IRR	INST
	☒	☐	☐	☐	☐	☐

End Uses						
	SF	MF	COM	IRRMF	IRR	INST
Toilets	☒	☐	☐	☐	☐	☐
Urinals	☐	☐	☐	☐	☐	☐
Faucets	☒	☐	☐	☐	☐	☐
Showers	☒	☐	☐	☐	☐	☐
Dishwashers	☒	☐	☐	☐	☐	☐
Clothes Washers	☒	☐	☐	☐	☐	☐
Process	☐	☐	☐	☐	☐	☐
Kitchen Spray Rinse	☐	☐	☐	☐	☐	☐
Internal Leakage	☒	☐	☐	☐	☐	☐
Baths	☒	☐	☐	☐	☐	☐
Other	☐	☐	☐	☐	☐	☐
Irrigation	☒	☐	☐	☐	☐	☐
Pools	☒	☐	☐	☐	☐	☐
Wash Down	☒	☐	☐	☐	☐	☐
Car Washing	☒	☐	☐	☐	☐	☐
External Leakage	☒	☐	☐	☐	☐	☐
Outdoor	☐	☐	☐	☐	☐	☐
Cooling	☐	☐	☐	☐	☐	☐

Comments
Cost assumes SF category but impacts all customer classes. Public info budget of \$2 per SF account is assumed.
School education Assumes Average cost per student is \$1 per SF account.

Results	
Average Water Savings (mgd)	0.004357
Lifetime Savings - Present Value (\$)	
Utility	\$132,286
Community	\$195,776
Lifetime Costs - Present Value (\$)	
Utility	\$343,099
Community	\$343,099
Benefit to Cost Ratio	
Utility	0.39
Community	0.57
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$8,293

End Use Savings Per Replacement	
	% Savings per Account
SF Toilets	0.5%
SF Faucets	0.5%
SF Showers	0.5%
SF Dishwashers	0.5%
SF Clothes Washers	0.5%
SF Baths	0.5%
SF Internal Leakage	0.5%
SF Irrigation	0.5%
SF Pools	0.5%
SF Wash Down	0.5%
SF Car Washing	0.5%
SF External Leakage	0.5%

Targets	
Target Method	Percentage
% of Accts Targeted / yr	25.000%
Only Effects New Accts	☐

Costs			
Year	Utility	Customer	Total
2015	\$17,868	\$0	\$17,868
2016	\$17,971	\$0	\$17,971
2017	\$18,074	\$0	\$18,074
2018	\$18,177	\$0	\$18,177
2019	\$18,281	\$0	\$18,281
2020	\$18,384	\$0	\$18,384

Targets		
Year	SF	Total
2015	1,554	1,554
2016	1,563	1,563
2017	1,572	1,572
2018	1,581	1,581
2019	1,590	1,590
2020	1,599	1,599

Water Savings (mgd)	
Year	Total Savings (mgd)
2015	0.002185
2016	0.004375
2017	0.004392
2018	0.004409
2019	0.004427
2020	0.004444



Prohibit Water Waste

Overview	
Name	Prohibit Water Waste
Abbr	6
Category	
Measure Type	Standard Measure

Time Period	Measure Life
First Year	2016
Last Year	2040
Measure Length	25

Fixture Costs			
	Utility	Customer	Fix /Acct
SF	\$50.00	\$50.00	1
MF	\$100.00	\$100.00	1
COM	\$100.00	\$100.00	1
IRRMF	\$100.00	\$100.00	1
IRR	\$100.00	\$100.00	1
INST	\$100.00	\$100.00	1

Administration Costs	
Markup Percentage	50%

Description
CONTRACTOR OR REGIONAL MEASURE: Adopt or modify ordinance that prohibits the waste of water defined as gutter flooding, restrictions on watering days and failure to repair leaks in a timely manner.

Customer Classes						
	SF	MF	COM	IRRMF	IRR	INST
	☒	☒	☒	☒	☒	☒

End Uses						
	SF	MF	COM	IRRMF	IRR	INST
Toilets	☒	☒	☒	☒	☒	☒
Urinals	☒	☒	☒	☒	☒	☒
Faucets	☒	☒	☒	☒	☒	☒
Show ers	☒	☒	☒	☒	☒	☒
Dishw ashers	☒	☒	☒	☒	☒	☒
Clothes Washers	☒	☒	☒	☒	☒	☒
Process	☒	☒	☒	☒	☒	☒
Kitchen Spray Rinse	☒	☒	☒	☒	☒	☒
Internal Leakage	☒	☒	☒	☒	☒	☒
Baths	☒	☒	☒	☒	☒	☒
Other	☒	☒	☒	☒	☒	☒
Irrigation	☒	☒	☒	☒	☒	☒
Pools	☒	☒	☒	☒	☒	☒
Wash Down n	☒	☒	☒	☒	☒	☒
Car Washing	☒	☒	☒	☒	☒	☒
External Leakage	☒	☒	☒	☒	☒	☒
Outdoor	☒	☒	☒	☒	☒	☒
Cooling	☒	☒	☒	☒	☒	☒

Comments
Utility costs based on 1 hour of staff time for residential contact and 2 hours for MF and CII enforcement. Assume \$50 customer cost to fix irrigation water waste/leak - most visible water waste is irrigation. Savings assumes 6% of accounts have a leak of 33 gallons per day. Assumed 1% water savings per account to be conservative. Administration cost is to cover staff to help find and investigate the water waste calls / leaks.

Results	
Average Water Savings (mgd)	
0.000556	
Lifetime Savings - Present Value (\$)	
Utility	\$16,159
Community	\$16,159
Lifetime Costs - Present Value (\$)	
Utility	\$103,151
Community	\$171,918
Benefit to Cost Ratio	
Utility	0.16
Community	0.09
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$19,546

End Use Savings Per Replacement	
	% Savings per Account
SF Internal Leakage	1.0%
SF Irrigation	1.0%
SF External Leakage	1.0%
MF Internal Leakage	1.0%
MF Irrigation	1.0%
MF External Leakage	1.0%
COM Internal Leakage	1.0%
COM Irrigation	1.0%
COM External Leakage	1.0%
INST Internal Leakage	1.0%
INST Irrigation	1.0%
INST External Leakage	1.0%
IRRMF Internal Leakage	1.0%
IRRMF Irrigation	1.0%
IRRMF External Leakage	1.0%
IRR Internal Leakage	1.0%
IRR Irrigation	1.0%
IRR External Leakage	1.0%

Targets	
Target Method	Percentage
% of Accts Targeted / yr	1.000%
Only Effects New Accts	☒

Costs			
Year	Utility	Customer	Total
2015	\$0	\$0	\$0
2016	\$5,698	\$3,799	\$9,497
2017	\$5,731	\$3,821	\$9,552
2018	\$5,764	\$3,843	\$9,607
2019	\$5,797	\$3,865	\$9,661
2020	\$5,830	\$3,886	\$9,716

Targets							
Year	SF	MF	COM	INST	IRRMF	IRR	Total
2015	0	0	0	0	0	0	0
2016	63	4	2	0	0	0	69
2017	63	4	2	0	0	0	70
2018	63	4	2	0	0	0	70
2019	64	4	2	0	0	0	70
2020	64	4	2	0	0	0	71

Water Savings (mgd)	
Year	Total Savings (mgd)
2015	0.000000
2016	0.000120
2017	0.000242
2018	0.000364
2019	0.000486
2020	0.000609



Indoor and Outdoor Surveys - CII

Overview			
Name	Indoor and Outdoor Surveys - CII		
Abbr	7		
Category	▼		
Measure Type	Standard Measure		

Time Period		Measure Life	
First Year	2015	Permanent	☐
Last Year	2040	Years	5
Measure Length	26	Repeat	☐

Fixture Costs			
	Utility	Customer	Fix/Acct
COM	\$3,000.00	\$2,500.00	1
INST	\$3,000.00	\$2,500.00	1

Administration Costs	
Markup Percentage	25%

Description	
CONTRACTOR OR REGIONAL MEASURE: Top water customers from each CII category would be offered a professional water survey that would evaluate ways for the business to save water and money. The surveys would be for targeted to large users (accounts that use more than 5,000 gallons of water per day) such as hotels, restaurants, stores and schools. Emphasis will be on supporting the top users in each customer category. After the free water use survey has been completed at site, SMWSP will analyze the recommendations on the provided findings report and determine if the site qualifies for a financial incentive.	

Customer Classes						
	UF	MF	COM	IRRVF	IRR	INST
☐	☐	☐	☒	☐	☐	☐

End Uses						
	UF	MF	COM	IRRVF	IRR	INST
Toilets	☐	☐	☒	☐	☐	☐
Urinals	☐	☐	☒	☐	☐	☐
Faucets	☐	☐	☒	☐	☐	☐
Showers	☐	☐	☒	☐	☐	☐
Dishwashers	☐	☐	☒	☐	☐	☐
Clothes Washers	☐	☐	☒	☐	☐	☐
Process	☐	☐	☒	☐	☐	☐
Kitchen Spray Rinse	☐	☐	☒	☐	☐	☐
Internal Leakage	☐	☐	☒	☐	☐	☐
Baths	☐	☐	☒	☐	☐	☐
Other	☐	☐	☒	☐	☐	☐
Irrigation	☐	☐	☒	☐	☐	☐
Pools	☐	☐	☐	☐	☐	☒
Wash Down	☐	☐	☐	☐	☐	☐
Car Washing	☐	☐	☐	☐	☐	☐
External Leakage	☐	☐	☒	☐	☐	☒
Outdoor	☐	☐	☐	☐	☐	☐
Cooling	☐	☐	☒	☐	☐	☒

Comments	
Utility costs represent staff site survey time and reporting. Customer costs estimate any costs to implement survey recommendations. Overall average savings for the targeted large customers are per end use since fixture and appliance recommendations will vary. It is recommended target this program to start with the top users in the service area. (an helps to explain why the target percentage is only 1% since targeting the largest users).	

Results	
Average Water Savings (mgd)	0.007140
Lifetime Savings - Present Value (\$)	
Utility	\$211,229
Community	\$368,015
Lifetime Costs - Present Value (\$)	
Utility	\$289,587
Community	\$482,645
Benefit to Cost Ratio	
Utility	0.73
Community	0.76
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$4,271

End Use Savings Per Replacement	
	% Savings per Account
COM Toilets	25.0%
COM Urinals	25.0%
COM Faucets	25.0%
COM Showers	25.0%
COM Dishwashers	25.0%
COM Clothes Washers	25.0%
COM Process	25.0%
COM Kitchen Spray Rinse	25.0%
COM Internal Leakage	25.0%
COM Other	25.0%
COM Cooling	25.0%
COM Irrigation	25.0%
COM External Leakage	25.0%
INST Toilets	25.0%
INST Urinals	25.0%
INST Faucets	25.0%
INST Showers	25.0%
INST Dishwashers	25.0%
INST Clothes Washers	25.0%
INST Kitchen Spray Rinse	25.0%
INST Internal Leakage	25.0%
INST Other	25.0%
INST Cooling	25.0%
INST Irrigation	25.0%
INST Pools	25.0%
INST External Leakage	25.0%

Targets	
Target Method	Percentage ▼
% of Accts Targeted / yr	2.000%
Only Effects New Accts	☐

Costs			
Year	Utility	Customer	Total
2015	\$15,013	\$10,008	\$25,021
2016	\$15,105	\$10,070	\$25,174
2017	\$15,197	\$10,131	\$25,328
2018	\$15,289	\$10,193	\$25,481
2019	\$15,381	\$10,254	\$25,635
2020	\$15,473	\$10,315	\$25,789

Targets			
Year	COM	INST	Total
2015	3	1	4
2016	3	1	4
2017	3	1	4
2018	3	1	4
2019	3	1	4
2020	3	1	4

Water Savings (mgd)	
Total Savings (mgd)	
2015	0.001500
2016	0.003003
2017	0.004511
2018	0.006024
2019	0.007541
2020	0.007575



Replace CII Inefficient Equipment

Overview			
Name	Replace CII Inefficient Equipm		
Abbr	8		
Category			
Measure Type	Standard Measure		

Time Period	
First Year	2018
Last Year	2022
Measure Length	5

Measure Life	
Permanent	☐
Years	10
Repeat	☐

Fixture Costs			
	Utility	Customer	Fix/Acct
COM	\$3,000.00	\$3,000.00	1
INST	\$3,000.00	\$3,000.00	1

Administration Costs	
Markup Percentage	30%

Description
CONTRACTOR OR REGIONAL MEASURE: After undergoing a free water use survey, SMWSP will analyze the recommendations on the provided findings report and determine if the site qualifies for a financial incentive. Financial incentives will be provided after analyzing the cost benefit ratio of each proposed project. Incentives are tailored to each individual site as each site has varying water savings potentials. Incentives will be granted at the sole discretion of SMWSP while funding lasts. Program to provide rebates for a standard list of water efficient equipment. Included would be x-ray machines, icemakers, air-cooled ice machines, steamers, washers, spray valves, efficient dishwashers, replacing once through cooling, and adding conductivity controller on cooling towers.

Customer Classes						
	SF	MF	COM	IRRMF	IRR	INST
	☐	☐	☒	☐	☐	☒

End Uses						
	SF	MF	COM	IRRMF	IRR	INST
Toilets			☒			☒
Urinals			☒			☒
Faucets			☒			☒
Showers			☒			☒
Dishwashers			☒			☒
Clothes Washers			☒			☒
Process			☒			
Kitchen Spray Rinse			☒			☒
Internal Leakage			☐			☐
Baths			☐			☐
Other			☐			☐
Irrigation			☐			☐
Pools			☐			☐
Wash Down			☐			☐
Car Washing			☐			☐
External Leakage			☐			☐
Outdoor			☐			☐
Cooling			☐			☐

Comments
Estimated Utility/Customer 50/50 cost sharing. Ice machines and food steamers are new and just getting started. Limited on any water-cooled ice machines. This measure can be adjusted to incorporate any CII technology that is deemed appropriate by the program participants to allow flexibility to adapt to new technology advancements.

Results	
Average Water Savings (mgd)	0.000406
Lifetime Savings - Present Value (\$)	
Utility	\$13,318
Community	\$30,127
Lifetime Costs - Present Value (\$)	
Utility	\$17,328
Community	\$30,657
Benefit to Cost Ratio	
Utility	0.77
Community	0.98
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$4,498

End Use Savings Per Replacement	
	% Savings per Account
COM Toilets	25.0%
COM Urinals	25.0%
COM Faucets	25.0%
COM Showers	25.0%
COM Dishwashers	25.0%
COM Clothes Washers	25.0%
COM Process	25.0%
COM Kitchen Spray Rinse	25.0%
INST Toilets	25.0%
INST Urinals	25.0%
INST Faucets	25.0%
INST Showers	25.0%
INST Dishwashers	25.0%
INST Clothes Washers	25.0%
INST Kitchen Spray Rinse	25.0%

Targets	
Target Method	Percentage
% of Accts Targeted / yr	0.500%
Only Effects New Accts	☐

Costs			
Year	Utility	Customer	Total
2015	\$0	\$0	\$0
2016	\$0	\$0	\$0
2017	\$0	\$0	\$0
2018	\$3,975	\$3,058	\$7,033
2019	\$3,999	\$3,076	\$7,075
2020	\$4,023	\$3,095	\$7,118

Targets			
Year	COM	INST	Total
2015	0	0	0
2016	0	0	0
2017	0	0	0
2018	1	0	1
2019	1	0	1
2020	1	0	1

Water Savings (mgd)	
Year	Total Savings (mgd)
2015	0.000000
2016	0.000000
2017	0.000000
2018	0.000212
2019	0.000424
2020	0.000636



Efficient Toilet Replacement Program - CII

Overview			
Name	Efficient Toilet Replacement P		
Abbr	9		
Category			
Measure Type	Standard Measure		

Time Period		Measure Life	
First Year	2015	Permanent	☒
Last Year	2019		
Measure Length	5		

Fixture Costs			
	Utility	Customer	Fix/Acct
COM	\$260.00	\$150.00	10
INST	\$260.00	\$150.00	10

Administration Costs	
Markup Percentage	30%

Description	
CONTRACTOR MEASURE: Efficient Toilet Replacement Program - CII. Provide a rebate or voucher for the installation of a high efficiency flushometer toilet - toilets flushing 1.28 gpf or less. Rebate amounts reflect the incremental purchase cost.	

Customer Classes						
	SF	MF	COM	IRRMF	IRR	INST
	☐	☐	☒	☐	☐	☒

End Uses						
	SF	MF	COM	IRRMF	IRR	INST
Toilets			☒			☒
Urinals			☐			☐
Faucets			☐			☐
Showers			☐			☐
Dishwashers			☐			☐
Clothes Washers			☐			☐
Process			☐			☐
Kitchen Spray Rinse			☐			☐
Internal Leakage			☐			☐
Baths			☐			☐
Other			☐			☐
Irrigation			☐			☐
Pools			☐			☐
Wash Down			☐			☐
Car Washing			☐			☐
External Leakage			☐			☐
Outdoor			☐			☐
Cooling			☐			☐

Comments	
Current outreach is regional and these costs are included in the public outreach measure. Form processing and check cutting are managed by the water contractor. Rebate for contractor is \$260 premium (less than 1.0 gpf) toilet purchase. The \$150 customer cost is for installation. Assumes 10 toilets per CII account. Savings are conservative and assume 50% of replaced toilets using 1.6 gpf and 50% using 3.5 gpf or more are replaced with 1.28 gpf fixtures.	

Results	
Average Water Savings (mgd)	
0.002812	
Lifetime Savings - Present Value (\$)	
Utility	\$83,840
Community	\$83,840
Lifetime Costs - Present Value (\$)	
Utility	\$96,865
Community	\$139,852
Benefit to Cost Ratio	
Utility	0.87
Community	0.60
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$3,627

End Use Savings Per Replacement	
	% Savings per Account
COM Toilets	42.0%
INST Toilets	42.0%

Targets	
Target Method	Percentage
% of Accts Targeted / yr	3.000%
Only Effects New Accts	☐

Costs			
	Utility	Customer	Total
2015	\$20,297	\$9,008	\$29,304
2016	\$20,421	\$9,063	\$29,484
2017	\$20,546	\$9,118	\$29,664
2018	\$20,671	\$9,173	\$29,844
2019	\$20,795	\$9,229	\$30,024
2020	\$0	\$0	\$0

Targets			
	COM	INST	Total
2015	5	1	6
2016	5	1	6
2017	5	1	6
2018	5	1	6
2019	5	1	6
2020	0	0	0

Water Savings (mgd)	
Total Savings (mgd)	
2015	0.000630
2016	0.001258
2017	0.001886
2018	0.002513
2019	0.003139
2020	0.003128



**Urinal Rebates
- CII**

Overview	
Name	Urinal Rebates - CII
Abbr	10
Category	Standard Measure
Measure Type	Standard Measure

Time Period	
First Year	2016
Last Year	2020
Measure Length	5

Measure Life	
Permanent	☒

Fixture Costs			
	Utility	Customer	Fix/Acct
COM	\$450.00	\$100.00	10
INST	\$450.00	\$100.00	10

Administration Costs	
Markup Percentage	25%

Description

CONTRACTOR MEASURE: Provide a rebate or voucher for the installation of a high efficiency urinals. WaterSense standard is 0.5 gpf or less, though models flushing as low as 0.125 gpf (1 pint) are available and function well, so could be specified. Rebate amounts would reflect the incremental purchase cost.

Customer Classes						
	SF	MF	COM	IRRMF	IRR	INST
	☐	☐	☒	☐	☐	☒

End Uses						
	SF	MF	COM	IRRMF	IRR	INST
Toilets	☐	☐	☐	☐	☐	☐
Urinals	☐	☐	☒	☐	☐	☒
Faucets	☐	☐	☐	☐	☐	☐
Showers	☐	☐	☐	☐	☐	☐
Dishwashers	☐	☐	☐	☐	☐	☐
Clothes Washers	☐	☐	☐	☐	☐	☐
Process	☐	☐	☐	☐	☐	☐
Kitchen Spray Rinse	☐	☐	☐	☐	☐	☐
Internal Leakage	☐	☐	☐	☐	☐	☐
Baths	☐	☐	☐	☐	☐	☐
Other	☐	☐	☐	☐	☐	☐
Irrigation	☐	☐	☐	☐	☐	☐
Pools	☐	☐	☐	☐	☐	☐
Wash Down	☐	☐	☐	☐	☐	☐
Car Washing	☐	☐	☐	☐	☐	☐
External Leakage	☐	☐	☐	☐	☐	☐
Outdoor	☐	☐	☐	☐	☐	☐
Cooling	☐	☐	☐	☐	☐	☐

Comments

Per Santa Rosa's current program, rebate amount is up to \$450 per urinal. Water savings of 75% is based on replacing a 1.0 gpf or more urinal and a 0.25 gpf to 0.125 gpf (1 pint) urinal. Assumes 10 urinals per CII account. Customer cost reflects installation and fixture costs.

Results	
Average Water Savings (mgd)	
0.000262	
Lifetime Savings - Present Value (\$)	
Utility	\$7,775
Community	\$7,775
Lifetime Costs - Present Value (\$)	
Utility	\$26,240
Community	\$30,905
Benefit to Cost Ratio	
Utility	0.30
Community	0.25
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$10,552

End Use Savings Per Replacement	
	% Savings per Account
COM Urinals	75.0%
INST Urinals	75.0%

Targets	
Target Method	Percentage 0.500%
% of Accts Targeted / yr	0.500%
Only Effects New Accts	☐

Costs			
	Utility	Customer	Total
2015	\$0	\$0	\$0
2016	\$5,664	\$1,007	\$6,671
2017	\$5,699	\$1,013	\$6,712
2018	\$5,733	\$1,019	\$6,753
2019	\$5,768	\$1,025	\$6,793
2020	\$5,802	\$1,032	\$6,834

Targets			
	COM	INST	Total
2015	0	0	0
2016	1	0	1
2017	1	0	1
2018	1	0	1
2019	1	0	1
2020	1	0	1

Water Savings (mgd)	
	Total Savings (mgd)
2015	0.000000
2016	0.000070
2017	0.000138
2018	0.000204
2019	0.000268
2020	0.000331



Plumber Initiated UHET & HEU Retrofit

Overview			
Name	Plumber Initiated UHET & HEU		
Abbr	11		
Category			
Measure Type	Standard Measure		

Time Period	
First Year	2019
Last Year	2023
Measure Length	5

Measure Life	
Permanent	☒

Fixture Costs			
	Utility	Customer	Fix/Acct
COM	\$325.00	\$100.00	10
INST	\$325.00	\$100.00	10

Administration Costs	
Markup Percentage	30%

Description	
CONTRACTOR MEASURE: Plumber Initiated High Efficiency Toilet and / or Urinal Retrofit Program. SMWSP would subsidize installation cost of a new UHET/ HEU purchased by SMWSP. Licensed plumbers, pre-qualified by SMWSP would solicit customers directly. Customers would get a new UHET and HEU installed at a discounted price.	

Customer Classes						
	SF	MF	COM	IRRMF	IRR	INST
	☒	☒	☒	☒	☒	☒

End Uses						
	SF	MF	COM	IRRMF	IRR	INST
Toilets			☒			☒
Urinals			☒			☒
Faucets						
Showers						
Dishwashers						
Clothes Washers						
Process						
Kitchen Spray Rinse						
Internal Leakage						
Baths						
Other						
Irrigation						
Pools						
Wash Down						
Car Washing						
External Leakage						
Outdoor						
Cooling						

Comments	
Utility cost based on installation cost of \$325 per Carrie Pollard at SCWA provided costs. Customer cost based on the fixture cost plus reduced installation cost. Water savings based on the average difference between 1.0 gpf urinal and a 0.25 gpf to 0.125 gpf (1 pint) urinal and a 1.6 gpf toilet and 1.0 gpf toilet. Assumes 10 urinals or toilets per CII account.	

Results	
Average Water Savings (mgd)	
0.001246	
Lifetime Savings - Present Value (\$)	
Utility	\$34,855
Community	\$34,855
Lifetime Costs - Present Value (\$)	
Utility	\$36,612
Community	\$45,278
Benefit to Cost Ratio	
Utility	0.95
Community	0.77
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$3,095

End Use Savings Per Replacement	
	% Savings per Account
COM Toilets	42.0%
COM Urinals	75.0%
INST Toilets	42.0%
INST Urinals	75.0%

Targets	
Target Method	Percentage
% of Accts Targeted / yr	1.000%
Only Effects New Accts	☐

Costs			
	Utility	Customer	Total
2015	\$0	\$0	\$0
2016	\$0	\$0	\$0
2017	\$0	\$0	\$0
2018	\$0	\$0	\$0
2019	\$8,665	\$2,051	\$10,715
2020	\$8,717	\$2,063	\$10,780

Targets			
	COM	INST	Total
2015	0	0	0
2016	0	0	0
2017	0	0	0
2018	0	0	0
2019	2	0	2
2020	2	0	2

Water Savings (mgd)	
	Total Savings (mgd)
2015	0.000000
2016	0.000000
2017	0.000000
2018	0.000000
2019	0.000347
2020	0.000691



**Require <0.25
gal/flush
Urinals in New**

Overview	
Name	Require <0.25 gal/flush Urinals
Abbr	12
Category	Standard Measure
Measure Type	Standard Measure

Time Period	
First Year	2017
Last Year	2021
Measure Length	5

Measure Life	
Permanent	☒

Fixture Costs			
	Utility	Customer	Fix/Acct
COM	\$75.00	\$300.00	10
INST	\$75.00	\$300.00	10

Administration Costs	
Markup Percentage	10%

Description
CONTRACTOR MEASURE: Require that new buildings be fitted with .125 gpf (1 pint) or less urinals rather than the current standard of 0.5 gal/flush models.

Customer Classes						
	SF	MF	COM	IRRMF	IRR	INST
	☐	☐	☒	☐	☐	☒

End Uses						
	SF	MF	COM	IRRMF	IRR	INST
Toilets	☐	☐	☐	☐	☐	☐
Urinals	☐	☐	☒	☐	☐	☒
Faucets	☐	☐	☐	☐	☐	☐
Showers	☐	☐	☐	☐	☐	☐
Dishwashers	☐	☐	☐	☐	☐	☐
Clothes Washers	☐	☐	☐	☐	☐	☐
Process	☐	☐	☐	☐	☐	☐
Kitchen Spray Rinse	☐	☐	☐	☐	☐	☐
Internal Leakage	☐	☐	☐	☐	☐	☐
Baths	☐	☐	☐	☐	☐	☐
Other	☐	☐	☐	☐	☐	☐
Irrigation	☐	☐	☐	☐	☐	☐
Pools	☐	☐	☐	☐	☐	☐
Wash Down	☐	☐	☐	☐	☐	☐
Car Washing	☐	☐	☐	☐	☐	☐
External Leakage	☐	☐	☐	☐	☐	☐
Outdoor	☐	☐	☐	☐	☐	☐
Cooling	☐	☐	☐	☐	☐	☐

Comments
Utility costs of \$75 reflects inspection costs. Customer costs represent the incremental cost of the more efficient fixture.
Savings assumes 0.5 gpf urinals are being replaced with .125 gpf urinals. Assume 10 fixtures per CII account.

Results	
Average Water Savings (mgd)	
0.000277	
Lifetime Savings - Present Value (\$)	
Utility	\$8,118
Community	\$8,118
Lifetime Costs - Present Value (\$)	
Utility	\$4,154
Community	\$19,260
Benefit to Cost Ratio	
Utility	1.95
Community	0.42
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$1,577

End Use Savings Per Replacement	
	% Savings per Account
COM Urinals	75.0%
INST Urinals	75.0%

Targets	
Target Method	Percentage 100.000%
% of Accts Targeted / yr	100.000%
Only Effects New Accts	☒

Costs			
Year	Utility	Customer	Total
2015	\$0	\$0	\$0
2016	\$0	\$0	\$0
2017	\$1,013	\$3,685	\$4,699
2018	\$1,013	\$3,685	\$4,699
2019	\$1,013	\$3,685	\$4,699
2020	\$1,013	\$3,685	\$4,699

Targets			
Year	COM	INST	Total
2015	0	0	0
2016	0	0	0
2017	1	0	1
2018	1	0	1
2019	1	0	1
2020	1	0	1

Water Savings (mgd)	
Year	Total Savings (mgd)
2015	0.000000
2016	0.000000
2017	0.000084
2018	0.000165
2019	0.000244
2020	0.000320



HE Faucet Aerator / Showerhead

Overview			
Name	HE Faucet Aerator / Showerhead		
Abbr	13		
Category	▼		
Measure Type	Standard Measure		

Time Period	
First Year	2015
Last Year	2019
Measure Length	5

Measure Life	
Permanent	☐
Years	5
Repeat	☐

Fixture Costs			
	Utility	Customer	Fix/Acct
COM	\$12.00	\$25.00	10
INST	\$12.00	\$25.00	10

Administration Costs	
Markup Percentage	25%

Description
CONTRACTOR MEASURE: High Efficiency Faucet Aerator / Showerhead Giveaway – CII. Utility would buy showerheads and faucet aerators in bulk and give them away at Utility office or community events.

Customer Classes						
	SF	MF	COM	IRRMF	IRR	INST
	☐	☐	☒	☐	☐	☒

End Uses						
	SF	MF	COM	IRRMF	IRR	INST
Toilets	☐	☐	☐	☐	☐	☐
Urinals	☐	☐	☐	☐	☐	☐
Faucets	☐	☐	☒	☐	☐	☒
Showers	☐	☐	☒	☐	☐	☒
Dishwashers	☐	☐	☐	☐	☐	☐
Clothes Washers	☐	☐	☐	☐	☐	☐
Process	☐	☐	☐	☐	☐	☐
Kitchen Spray Rinse	☐	☐	☐	☐	☐	☐
Internal Leakage	☐	☐	☐	☐	☐	☐
Baths	☐	☐	☐	☐	☐	☐
Other	☐	☐	☐	☐	☐	☐
Irrigation	☐	☐	☐	☐	☐	☐
Pools	☐	☐	☐	☐	☐	☐
Wash Down	☐	☐	☐	☐	☐	☐
Car Washing	☐	☐	☐	☐	☐	☐
External Leakage	☐	☐	☐	☐	☐	☐
Outdoor	☐	☐	☐	☐	☐	☐
Cooling	☐	☐	☐	☐	☐	☐

Comments
Assumes 10 bathrooms per CII account. Utility cost for 1.8gpm showerhead and 1.5 gpm aerator kit is \$12. Customer cost \$25 is to repair leaks or other minor costs. Assume kits save 27.6% (reduced to be conservative) by assuming only 25% of kits are actually installed in the businesses and yield water savings. Petaluma provided actual cost data: 2.0GPM SH, 1.0 and 0.5 GPM FA. Unit cost per 1.0GPM FA - \$0.78 per 2.0GPM SH - \$3.51. Or just over \$4 per kit. The \$12 per kit cost assumes that only 25% are actually installed. (\$4 times 4 kits to obtain one installation).

Results			
Average Water Savings (mgd)			
0.000148			
Lifetime Savings - Present Value (\$)			
Utility	\$5,696		
Community	\$14,079		
Lifetime Costs - Present Value (\$)			
Utility	\$7,165		
Community	\$19,106		
Benefit to Cost Ratio			
Utility	0.80		
Community	0.74		
Cost of Savings per Unit Volume (\$/mg)			
Utility	\$5,101		

End Use Savings Per Replacement	
	% Savings per Account
COM Faucets	6.9%
COM Showers	6.9%
INST Faucets	6.9%
INST Showers	6.9%

Targets	
Target Method	Percentage ▼
% of Accts Targeted / yr	5.000%
Only Effects New Accts	☐

Costs			
	Utility	Customer	Total
2015	\$1,501	\$2,502	\$4,003
2016	\$1,510	\$2,517	\$4,028
2017	\$1,520	\$2,533	\$4,052
2018	\$1,529	\$2,548	\$4,077
2019	\$1,538	\$2,564	\$4,102
2020	\$0	\$0	\$0

Targets			
	COM	INST	Total
2015	8	2	10
2016	8	2	10
2017	8	2	10
2018	8	2	10
2019	9	2	10
2020	0	0	0

Water Savings (mgd)	
	Total Savings (mgd)
2015	0.000152
2016	0.000305
2017	0.000459
2018	0.000613
2019	0.000769
2020	0.000617



HE Faucet Aerator / Showerhead

Overview				Customer Classes						Results			
Name		HE Faucet Aerator / Showerhead		SF		MF		COM		IRR		INST	
Abbr		14		☒		☒		☐		☐		☐	
Category				☐		☐		☐		☐		☐	
Measure Type		Standard Measure		☐		☐		☐		☐		☐	
Time Period				Measure Life				End Uses					
First Year		2015		Permanent		☐		Toilets		☐		☐	
Last Year		2019		Years		5		Urinals		☐		☐	
Measure Length		5		Repeat		☐		Faucets		☒		☒	
								Showers		☒		☒	
								Dishwashers		☐		☐	
								Clothes Washers		☐		☐	
								Process		☐		☐	
								Kitchen Spray Rinse		☐		☐	
								Internal Leakage		☐		☐	
								Baths		☐		☐	
								Other		☐		☐	
								Irrigation		☐		☐	
								Pools		☐		☐	
								Wash Down		☐		☐	
								Car Washing		☐		☐	
								External Leakage		☐		☐	
								Outdoor		☐		☐	
								Cooling		☐		☐	
Fixture Costs				Administration Costs				Description					
Utility		Customer		Fix/Acct		Markup Percentage		25%		CONTRACTOR MEASURE: High Efficiency Faucet Aerator / Showerhead Giveaway - SF, MF. Utility would buy showerheads and faucet aerators in bulk and give them away at Utility office or community events. Need to coordinate this program with the School Education measure on retrofit kit giveaways to the same customer categories.			
SF		\$12.00		\$25.00		2							
MF		\$12.00		\$25.00		8							
Comments				Targets				End Use Savings Per Replacement					
Assumes minimum 2 bathrooms per SF account and 4 units or 8 bathrooms per MF account. Utility cost for 1.8gpm showerhead and 1.5gpm aerator kit is \$12. Customer cost \$25 is to repair leaks or other minor costs. Assume kits save 27.6% (reduced to be conservative) by assuming only 25% of kits are actually installed in the homes and yield water savings.				Target Method		Percentage		SF Faucets		6.9%			
				% of Accts Targeted / yr		2.000%		SF Showers		6.9%			
				Only Effects New Accts		☐		MF Faucets		6.9%			
								MF Showers		6.9%			
Costs				Water Savings (mgd)									
Summary		Utility		Customer		Total		Total Savings (mgd)					
2015		\$4,779		\$7,964		\$12,743		2015		0.000811			
2016		\$4,806		\$8,010		\$12,816		2016		0.001621			
2017		\$4,834		\$8,056		\$12,890		2017		0.002428			
2018		\$4,861		\$8,102		\$12,964		2018		0.003235			
2019		\$4,889		\$8,148		\$13,037		2019		0.004040			
2020		\$0		\$0		\$0		2020		0.003229			



Indoor and Outdoor Surveys - SF,

Overview			
Name	Indoor and Outdoor Surveys - SF		
Abbr	15		
Category	Standard Measure		
Measure Type	Standard Measure		

Time Period	
First Year	2015
Last Year	2040
Measure Length	26

Measure Life	
Permanent	☐
Years	5
Repeat	☐

Fixture Costs			
	Utility	Customer	Fix/Acct
SF	\$162.00	\$50.00	1
MF	\$534.00	\$50.00	1

Administration Costs	
Markup Percentage	30%

Description

REGIONAL OR CONTRACTOR MEASURE:
 Indoor and outdoor water surveys for existing residential customers. Target those with high water use and provide a customized report to owner. May include give-away of efficient shower heads, aerators, and toilet devices. Customer leaks can go uncorrected at properties where owners are least able to pay costs of repair. These programs may require that customer leaks be repaired, with either part of the repair subsidized and/or the cost paid with revolving funds paid back with water bills over time. May also include an option to replace inefficient plumbing fixtures at low-income residences. May include adjustments to irrigation schedules on automatic irrigation controllers. Provide incentive to install pressure regulating valve on existing properties with pressure exceeding 80 psi.

Customer Classes						
	SF	MF	COM	IRRMF	IRR	INST
	☒	☒	☐	☐	☐	☐

End Uses						
	SF	MF	COM	IRRMF	IRR	INST
Toilets	☒	☒	☐	☐	☐	☐
Urinals	☒	☒	☐	☐	☐	☐
Faucets	☒	☒	☐	☐	☐	☐
Showers	☒	☒	☐	☐	☐	☐
Dishwashers	☒	☒	☐	☐	☐	☐
Clothes Washers	☒	☒	☐	☐	☐	☐
Process	☐	☐	☐	☐	☐	☐
Kitchen Spray Rinse	☐	☐	☐	☐	☐	☐
Internal Leakage	☒	☒	☐	☐	☐	☐
Baths	☒	☒	☐	☐	☐	☐
Other	☒	☒	☐	☐	☐	☐
Irrigation	☒	☒	☐	☐	☐	☐
Pools	☒	☒	☐	☐	☐	☐
Wash Down	☒	☒	☐	☐	☐	☐
Car Washing	☒	☒	☐	☐	☐	☐
External Leakage	☒	☒	☐	☐	☐	☐
Outdoor	☐	☐	☐	☐	☐	☐
Cooling	☐	☐	☐	☐	☐	☐

Comments

Utility costs for staff survey time and any giveaway devices. Customer cost reflects Utility costs for staff survey time and any giveaway devices. Customer cost reflects average cost to address report recommendations. Includes \$12 per unit for kit giveaways. Assumes 1 kit for SF and 4 kits for MF units (1 per unit not one per bathroom). Assume 5% savings for indoor suggestions and 10% savings for outdoor suggestions. Savings reflect average values since survey suggestions, device distribution and fixture and appliance recommendations and upgrades will vary.

Results	
Average Water Savings (mgd)	0.003884
Lifetime Savings - Present Value (\$)	
Utility	\$115,112
Community	\$154,016
Lifetime Costs - Present Value (\$)	
Utility	\$154,813
Community	\$186,747
Benefit to Cost Ratio	
Utility	0.74
Community	0.82
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$4,197

End Use Savings Per Replacement	
	% Savings per Account
SF Toilets	5.0%
SF Faucets	5.0%
SF Showers	5.0%
SF Dishwashers	5.0%
SF Clothes Washers	5.0%
SF Baths	5.0%
SF Internal Leakage	5.0%
SF Other	5.0%
SF Irrigation	10.0%
SF Pools	10.0%
SF Wash Down	10.0%
SF Car Washing	10.0%
SF External Leakage	10.0%
MF Toilets	5.0%
MF Faucets	5.0%
MF Showers	5.0%
MF Dishwashers	5.0%
MF Clothes Washers	5.0%
MF Baths	5.0%
MF Internal Leakage	5.0%
MF Other	5.0%
MF Irrigation	10.0%
MF Pools	10.0%
MF Wash Down	10.0%
MF Car Washing	10.0%
MF External Leakage	10.0%

Targets	
Target Method	Percentage
% of Accts Targeted / yr	0.500%
Only Effects New Accts	☐

Costs			
	Utility	Customer	Total
2015	\$8,062	\$1,663	\$9,725
2016	\$8,109	\$1,673	\$9,781
2017	\$8,155	\$1,682	\$9,838
2018	\$8,202	\$1,692	\$9,894
2019	\$8,249	\$1,701	\$9,950
2020	\$8,295	\$1,711	\$10,006

Targets			
	SF	MF	Total
2015	31	2	33
2016	31	2	33
2017	31	2	34
2018	32	2	34
2019	32	2	34
2020	32	2	34

Water Savings (mgd)	
	Total Savings (mgd)
2015	0.000824
2016	0.001651
2017	0.002481
2018	0.003313
2019	0.004147
2020	0.004166



Efficient Toilet Replacement Program – SF

Overview			
Name	Efficient Toilet Replacement P		
Abbr	16		
Category			
Measure Type	Standard Measure		

Time Period	
First Year	2015
Last Year	2019
Measure Length	5

Measure Life	
Permanent	☒

Fixture Costs			
	Utility	Customer	Fix/Acct
SF	\$150.00	\$150.00	2

Administration Costs	
Markup Percentage	25%

Description
CONTRACTOR MEASURE: Provide a rebate or voucher for the installation of a ultra high efficiency toilet (UHET). UHET toilets flush 1.28 gpf or less and include dual flush technology. Rebate amounts would reflect the incremental purchase cost. Replacement program can be either a direct install or rebate program. Includes replacement of 1.6 gpf that are not well functioning.

Customer Classes						
	SF	MF	COM	IRRMF	IRR	INST
	☒	☐	☐	☐	☐	☐

End Uses						
	SF	MF	COM	IRRMF	IRR	INST
Toilets	☒	☐	☐	☐	☐	☐
Urinals	☐	☐	☐	☐	☐	☐
Faucets	☐	☐	☐	☐	☐	☐
Showers	☐	☐	☐	☐	☐	☐
Dishwashers	☐	☐	☐	☐	☐	☐
Clothes Washers	☐	☐	☐	☐	☐	☐
Process	☐	☐	☐	☐	☐	☐
Kitchen Spray Rinse	☐	☐	☐	☐	☐	☐
Internal Leakage	☐	☐	☐	☐	☐	☐
Baths	☐	☐	☐	☐	☐	☐
Other	☐	☐	☐	☐	☐	☐
Irrigation	☐	☐	☐	☐	☐	☐
Pools	☐	☐	☐	☐	☐	☐
Wash Down	☐	☐	☐	☐	☐	☐
Car Washing	☐	☐	☐	☐	☐	☐
External Leakage	☐	☐	☐	☐	☐	☐
Outdoor	☐	☐	☐	☐	☐	☐
Cooling	☐	☐	☐	☐	☐	☐

Comments
Rebate for utility is \$150 premium (less than 1.0 gpf) toilet purchase. The \$150 customer cost is for installation. Assumes 2 toilets per SF account. Model water savings of 42% and cost/benefits based on MMWD provided data using an average toilet flush volume of 2.2 gpf for existing toilets (weighted average of field measured toilets Sample size=638 toilets.

Results	
Average Water Savings (mgd)	0.001720
Lifetime Savings - Present Value (\$)	
Utility	\$51,527
Community	\$51,527
Lifetime Costs - Present Value (\$)	
Utility	\$61,131
Community	\$110,036
Benefit to Cost Ratio	
Utility	0.84
Community	0.47
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$3,742

End Use Savings Per Replacement	
	% Savings per Account
SF Toilets	41.8%

Targets	
Target Method	Percentage
% of Accts Targeted / yr	0.500%
Only Effects New Accts	☐

Costs			
	Utility	Customer	Total
2015	\$12,818	\$10,254	\$23,073
2016	\$12,892	\$10,314	\$23,206
2017	\$12,966	\$10,373	\$23,339
2018	\$13,040	\$10,432	\$23,473
2019	\$13,114	\$10,492	\$23,606
2020	\$0	\$0	\$0

Targets		
	SF	Total
2015	31	31
2016	31	31
2017	31	31
2018	32	32
2019	32	32
2020	0	0

Water Savings (mgd)	
	Total Savings (mgd)
2015	0.000404
2016	0.000804
2017	0.001200
2018	0.001592
2019	0.001980
2020	0.001965



Direct Install UHET, Showerheads,

Overview			
Name	Direct Install UHET, Showerheads		
Abbr	17		
Category			
Measure Type	Standard Measure		

Time Period	
First Year	2019
Last Year	2025
Measure Length	7

Measure Life	
Permanent	☒

Fixture Costs			
	Utility	Customer	Fix/Acct
SF	\$325.00	\$100.00	2
MF	\$325.00	\$100.00	4

Administration Costs	
Markup Percentage	25%

Description	
CONTRACTOR OR REGIONAL MEASURE: Direct Install High Efficiency Toilets, Showerheads, and Faucet Aerators in Residential Buildings. Utility would subsidize installation cost of a new UHET purchased by the utility. Licensed plumbers, pre-qualified by the Utility would solicit customers directly. Customers would get a new UHET and showerheads and faucet aerators installed at a discounted price.	

Customer Classes						
	SF	MF	COM	IRR	INST	
	☒	☒	☐	☐	☐	

End Uses						
	SF	MF	COM	IRR	INST	
Toilets	☒	☒	☐	☐	☐	
Urinals	☐	☐	☐	☐	☐	
Faucets	☒	☒	☐	☐	☐	
Showers	☒	☒	☐	☐	☐	
Dishwashers	☐	☐	☐	☐	☐	
Clothes Washers	☐	☐	☐	☐	☐	
Process	☐	☐	☐	☐	☐	
Kitchen Spray Rinse	☐	☐	☐	☐	☐	
Internal Leakage	☐	☐	☐	☐	☐	
Baths	☐	☐	☐	☐	☐	
Other	☐	☐	☐	☐	☐	
Irrigation	☐	☐	☐	☐	☐	
Pools	☐	☐	☐	☐	☐	
Wash Down	☐	☐	☐	☐	☐	
Car Washing	☐	☐	☐	☐	☐	
External Leakage	☐	☐	☐	☐	☐	
Outdoor	☐	☐	☐	☐	☐	
Cooling	☐	☐	☐	☐	☐	

Comments	
Utility cost of current "on bill payment" direct installation program From Santa Rosa costs: \$375 for one package and \$649 for two. Research for new grant direct install program costs \$530 each package. Assume one unit package includes: • 1 UHET (0.8 gpf) Includes tank, bowl, seat, wax ring, brass bolts. • 1 Showerhead (1.5 gpm) • Bathroom aerator (up to 2) (1.5 gpm) • 1 Kitchen aerator (1.5 gpm) Assume 2 units per SF acct and 4 per MF acct. Customer cost based on incremental fixture and installation costs (\$100). Toilet water savings is based on 1.6 gpf and 3.5 gpf toilets being replaced with 1.0 gpf toilets. Showerhead and faucet aerator savings based on the replacement of 2.0 gpm or more showerheads with 1.5 gpm showerheads; and 3.0 gpm or greater faucets with 1.0 gpm faucet aerators.	

Results	
Average Water Savings (mgd)	
0.011176	
Lifetime Savings - Present Value (\$)	
Utility	\$307,417
Community	\$524,473
Lifetime Costs - Present Value (\$)	
Utility	\$169,684
Community	\$211,452
Benefit to Cost Ratio	
Utility	1.81
Community	2.48
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$1,599

End Use Savings Per Replacement	
	% Savings per Account
SF Toilets	60.0%
SF Faucets	50.0%
SF Showers	50.0%
MF Toilets	60.0%
MF Faucets	50.0%
MF Showers	50.0%

Targets	
Target Method	Percentage
% of Accts Targeted / yr	0.500%
Only Effects New Accts	☐

Costs			
	Utility	Customer	Total
2015	\$0	\$0	\$0
2016	\$0	\$0	\$0
2017	\$0	\$0	\$0
2018	\$0	\$0	\$0
2019	\$29,467	\$7,253	\$36,720
2020	\$29,633	\$7,294	\$36,928

Targets		
	SF	MF
2015	0	0
2016	0	0
2017	0	0
2018	0	0
2019	32	2
2020	32	2

Water Savings (mgd)	
	Total Savings (mgd)
2015	0.000000
2016	0.000000
2017	0.000000
2018	0.000000
2019	0.002266
2020	0.004523



HE Clothes Washer Rebate - SF,

Overview			
Name	HE Clothes Washer Rebate - SF		
Abbr	18		
Category	Standard Measure		
Measure Type	Standard Measure		

Time Period		Measure Life	
First Year	2015	Permanent	☒
Last Year	2019		
Measure Length	5		

Fixture Costs			
	Utility	Customer	Fix/Acct
SF	\$125.00	\$675.00	1
MF	\$125.00	\$675.00	1

Administration Costs	
Markup Percentage	25%

Description	
CONTRACTOR MEASURE: Provide a rebate for efficient washing machines to residential customers. It is assumed that the rebates would remain consistent with relevant state and federal regulations (Department of Energy, Energy Star) and only offer the best available technology.	

Customer Classes						
	SF	MF	COM	IRR/VF	IRR	INST
	☒	☒	☐	☐	☐	☐

End Uses						
	SF	MF	COM	IRR/VF	IRR	INST
Toilets	☐	☐	☐	☐	☐	☐
Urinals	☐	☐	☐	☐	☐	☐
Faucets	☐	☐	☐	☐	☐	☐
Showers	☐	☐	☐	☐	☐	☐
Dishwashers	☐	☐	☐	☐	☐	☐
Clothes Washers	☒	☒	☐	☐	☐	☐
Process	☐	☐	☐	☐	☐	☐
Kitchen Spray Rinse	☐	☐	☐	☐	☐	☐
Internal Leakage	☐	☐	☐	☐	☐	☐
Baths	☐	☐	☐	☐	☐	☐
Other	☐	☐	☐	☐	☐	☐
Irrigation	☐	☐	☐	☐	☐	☐
Pools	☐	☐	☐	☐	☐	☐
Wash Down	☐	☐	☐	☐	☐	☐
Car Washing	☐	☐	☐	☐	☐	☐
External Leakage	☐	☐	☐	☐	☐	☐
Outdoor	☐	☐	☐	☐	☐	☐
Cooling	☐	☐	☐	☐	☐	☐

Comments	
Current outreach is regional and these costs are included in the public outreach measure. Form processing and check cutting are managed by the water contractor. Water savings is based on difference between a 34 gallon per load machine compared to a 12 gallon per load CEE Tier 3 machine. Rebate of \$125/unit based on current average rebate amount among water contractors. Customer costs include installation.	

Results	
Average Water Savings (mgd)	0.003546
Lifetime Savings - Present Value (\$)	
Utility	\$108,227
Community	\$265,083
Lifetime Costs - Present Value (\$)	
Utility	\$32,221
Community	\$171,414
Benefit to Cost Ratio	
Utility	3.36
Community	1.55
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$957

End Use Savings Per Replacement	
	% Savings per Account
SF Clothes Washers	64.7%
MF Clothes Washers	64.7%

Targets	
Target Method	Percentage 0.650%
% of Accts Targeted / yr	
Only Effects New Accts	☐

Costs			
Year	Utility	Customer	Total
2015	\$6,756	\$29,186	\$35,942
2016	\$6,795	\$29,355	\$36,150
2017	\$6,834	\$29,524	\$36,358
2018	\$6,873	\$29,692	\$36,566
2019	\$6,912	\$29,861	\$36,773
2020	\$0	\$0	\$0

Targets			
Year	SF	MF	Total
2015	40	3	43
2016	41	3	43
2017	41	3	44
2018	41	3	44
2019	41	3	44
2020	0	0	0

Water Savings (mgd)	
Year	Total Savings (mgd)
2015	0.000902
2016	0.001809
2017	0.002718
2018	0.003629
2019	0.004539
2020	0.004526



Submeters Incentive

Overview				Customer Classes							Results	
Name		Submeters Incentive									Average Water Savings (mgd)	
Abbr		19									0.000627	
Category											Lifetime Savings - Present Value (\$)	
Measure Type		Standard Measure									Utility	
											\$15,990	
											Community	
											\$24,935	
											Lifetime Costs - Present Value (\$)	
											Utility	
											\$118,352	
											Community	
											\$149,912	
											Benefit to Cost Ratio	
											Utility	
											0.14	
											Community	
											0.17	
											Cost of Savings per Unit Volume (\$/mg)	
											Utility	
											\$19,863	
											End Use Savings Per Replacement	
											% Savings per Account	
											MF Toilets	
											15.0%	
											MF Faucets	
											15.0%	
											MF Showers	
											15.0%	
											MF Dishwashers	
											15.0%	
											MF Clothes Washers	
											15.0%	
											MF Internal Leakage	
											15.0%	
											MF Irrigation	
											15.0%	
											MF External Leakage	
											15.0%	
											Targets	
											Target Method	
											Percentage	
											% of Accts Targeted / yr	
											0.100%	
											Only Effects New Accts	
											1	
											Comments	
											Estimated \$150 utility cost and \$50 customer cost per meter. Assume 100 dwelling units (mobile homes) per account. DU = dwelling unit (i.e., mobile home). The target/participation rate of 0.1% assumes 1 property per 1,000 MF accounts. This is up to \$15,000 per customer.	
											Consider patterning after Santa Clara Valley Water District program.	
											http://www.valleywater.org/Programs/SubmeterRebateProgram.aspx	
											Costs	
											Summary	
											Utility	
											Customer	
											Total	
											2015	
											\$0	
											2016	
											\$0	
											2017	
											\$0	
											2018	
											\$0	
											2019	
											\$0	
											2020	
											\$8,437	
											\$2,250	
											\$10,687	
											Targets	
											Accounts	
											MF	
											Total	
											2015	
											0	
											2016	
											0	
											2017	
											0	
											2018	
											0	
											2019	
											0	
											2020	
											0	
											Water Savings (mgd)	
											Total Savings (mgd)	
											2015	
											0.000000	
											2016	
											0.000000	
											2017	
											0.000000	
											2018	
											0.000000	
											2019	
											0.000000	
											2020	
											0.000073	



Outdoor Large Landscape Audits & Assessments

Overview			
Name	Outdoor Large Landscape Audit		
Abbr	20		
Category			
Measure Type	Standard Measure		

Time Period	
First Year	2015
Last Year	2019
Measure Length	5

Measure Life	
Permanent	☐
Years	5
Repeat	☐

Fixture Costs			
	Utility	Customer	Fix/Acct
IRRMF	\$2,500.00	\$500.00	1
IRR	\$2,500.00	\$500.00	1

Administration Costs	
Markup Percentage	35%

Description
CONTRACTOR OR REGIONAL MEASURE: Outdoor water audits offered for existing large landscape customers. Normally those with high water use are targeted and provided a customized report on how to save water. All large multi-family residential, CII, and public irrigators of large landscapes would be eligible for free landscape water audits upon request. Website will provide feedback on irrigation water use (budget vs. actual). May include the cost for dedicated meter conversion.

Customer Classes						
	SF	MF	COM	IRRMF	IRR	INST
	☐	☐	☐	☒	☒	☐

End Uses						
	SF	MF	COM	IRRMF	IRR	INST
Toilets				☐	☐	
Urinals				☐	☐	
Faucets				☐	☐	
Showers				☐	☐	
Dishwashers				☐	☐	
Clothes Washers				☐	☐	
Process				☐	☐	
Kitchen Spray Rinse				☐	☐	
Internal Leakage				☐	☐	
Baths				☐	☐	
Other				☐	☐	
Irrigation				☒	☒	
Pools						
Wash Down						
Car Washing						
External Leakage				☒	☒	
Outdoor						
Cooling						

Comments
Regional - Green Business Program and some Contractor (more discussion needed). Assumes all large landscape accounts can apply. Assume an average site is 3 acres and costs \$500/acre to survey. Total Utility cost assumes \$1,500 per site survey and \$1,000 per water budget including some dedicated meter conversions. Savings assumes 15% irrigation and external leakage savings as a result of the survey and an additional 10% savings due to water budgeting and monitoring. Santa Rosa average commercial/irrigation lot size is 33,000 sq feet. Many companies are helping water utilities including WaterFluence and Eagleair.

Results	
Average Water Savings (mgd)	0.000640
Lifetime Savings - Present Value (\$)	
Utility	\$24,634
Community	\$24,634
Lifetime Costs - Present Value (\$)	
Utility	\$25,761
Community	\$29,578
Benefit to Cost Ratio	
Utility	0.96
Community	0.83
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$4,241

End Use Savings Per Replacement	
	% Savings per Account
IRRMF Irrigation	25.0%
IRRMF External Leakage	25.0%
IRR Irrigation	25.0%
IRR External Leakage	25.0%

Targets	
Target Method	Percentage
% of Accts Targeted / yr	5.000%
Only Effects New Accts	☐

Costs			
Year	Utility	Customer	Total
2015	\$5,400	\$800	\$6,200
2016	\$5,432	\$805	\$6,237
2017	\$5,464	\$810	\$6,274
2018	\$5,496	\$814	\$6,310
2019	\$5,528	\$819	\$6,347
2020	\$0	\$0	\$0

Targets			
Year	IRRMF	IRR	Total
2015	1	1	2
2016	1	1	2
2017	1	1	2
2018	1	1	2
2019	1	1	2
2020	0	0	0

Water Savings (mgd)	
Year	Total Savings (mgd)
2015	0.000657
2016	0.001319
2017	0.001984
2018	0.002653
2019	0.003326
2020	0.002669



Landscape Rebates and Incentives for

Overview	
Name	Landscape Rebates and Incentives for Equipment Upgrade
Abbr	21
Category	
Measure Type	Standard Measure

Time Period	
First Year	2015
Last Year	2019
Measure Length	5

Measure Life	
Permanent	☐
Years	10
Repeat	☐

Fixture Costs			
	Utility	Customer	Fix/Acct
SF	\$250.00	\$250.00	1
MF	\$250.00	\$250.00	1
COM	\$1,000.00	\$500.00	1
IRRMF	\$1,000.00	\$500.00	1
IRR	\$1,000.00	\$500.00	1
INST	\$1,000.00	\$500.00	1

Administration Costs	
Markup Percentage	25%

Description
CONTRACTOR MEASURE: For SF, MF, CI, and IRR customers with landscape, provide a Smart Landscape Rebate Program with rebates for substantive landscape retrofits or installation of water efficient upgrades; Rebates contribute towards the purchase and installation of water-wise plants, compost, mulch and selected types of irrigation equipment upgrades including: Large Rainwater Catchment Systems, Rain Barrels, Rain Sensors, Rotating Sprinkler Nozzles, Drip Irrigation Equipment, Weather Based Irrigation Controllers and Gray Water Systems.

Customer Classes						
	SF	MF	COM	IRRMF	IRR	INST
	☒	☒	☒	☒	☒	☒

End Uses						
	SF	MF	COM	IRRMF	IRR	INST
Toilets	☐	☐	☐	☐	☐	☐
Urinals	☐	☐	☐	☐	☐	☐
Faucets	☐	☐	☐	☐	☐	☐
Showers	☐	☐	☐	☐	☐	☐
Dishwashers	☐	☐	☐	☐	☐	☐
Clothes Washers	☐	☐	☐	☐	☐	☐
Process	☐	☐	☐	☐	☐	☐
Kitchen Spray Rinse	☐	☐	☐	☐	☐	☐
Internal Leakage	☐	☐	☐	☐	☐	☐
Baths	☐	☐	☐	☐	☐	☐
Other	☐	☐	☐	☐	☐	☐
Irrigation	☒	☒	☒	☒	☒	☒
Pools	☐	☐	☐	☐	☐	☐
Wash Down	☐	☐	☐	☐	☐	☐
Car Washing	☐	☐	☐	☐	☐	☐
External Leakage	☐	☐	☐	☐	☐	☐
Outdoor	☐	☐	☐	☐	☐	☐
Cooling	☐	☐	☐	☐	☐	☐

Comments
Rebate amounts based on Santa Rosa's current rebate program. Customer costs assume average installation costs and incremental equipment purchase costs. Average savings of 15% assumed since savings can range from 5%-25% per equipment upgrade. This program can potentially be modified to just target the larger accounts.

Results	
Average Water Savings (mgd)	
0.002603	
Lifetime Savings - Present Value (\$)	
Utility	\$93,342
Community	\$93,342
Lifetime Costs - Present Value (\$)	
Utility	\$112,990
Community	\$197,842
Benefit to Cost Ratio	
Utility	0.83
Community	0.47
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$4,571

End Use Savings Per Replacement	
	% Savings per Account
SF Irrigation	15.0%
MF Irrigation	15.0%
COM Irrigation	15.0%
INST Irrigation	15.0%
IRRMF Irrigation	15.0%
IRR Irrigation	15.0%

Targets	
Target Method	Percentage
% of Accts Targeted / yr	1.000%
Only Effects New Accts	☐

Costs			
	Summary		
	Utility	Customer	Total
2015	\$23,690	\$17,791	\$41,481
2016	\$23,828	\$17,894	\$41,722
2017	\$23,966	\$17,998	\$41,963
2018	\$24,104	\$18,101	\$42,205
2019	\$24,242	\$18,204	\$42,446
2020	\$0	\$0	\$0

Targets							
	Accounts						
	SF	MF	COM	INST	IRRMF	IRR	Total
2015	62	4	2	0	0	0	69
2016	63	4	2	0	0	0	69
2017	63	4	2	0	0	0	70
2018	63	4	2	0	0	0	70
2019	64	4	2	0	0	0	70
2020	0	0	0	0	0	0	0

Water Savings (mgd)	
	Total Savings (mgd)
2015	0.001338
2016	0.002684
2017	0.004038
2018	0.005399
2019	0.006768
2020	0.006768



Turf Removal - MF, CII

Overview	
Name	Turf Removal - MF, CII
Abbr	22
Category	
Measure Type	Standard Measure

Time Period	
First Year	2015
Last Year	2024
Measure Length	10

Measure Life	
Permanent	☒

Fixture Costs			
	Utility	Customer	Fix/Acct
MF	\$2,500.00	\$20,000.00	1
COM	\$2,500.00	\$20,000.00	1
IRRMF	\$2,500.00	\$20,000.00	1
IRR	\$2,500.00	\$20,000.00	1
INST	\$2,500.00	\$20,000.00	1

Administration Costs	
Markup Percentage	30%

Description

CONTRACTOR MEASURE: Provide a per square foot incentive to remove turf and replace with low water use plants or hardscape. Rebate is based on price per square foot removed, and capped at an upper limit for multi-family or commercial residence.

Customer Classes						
	SF	MF	COM	IRRMF	IRR	INST
	☐	☒	☐	☒	☒	☒

End Uses						
	SF	MF	COM	IRRMF	IRR	INST
Toilets	☐	☐	☐	☐	☐	☐
Urinals	☐	☐	☐	☐	☐	☐
Faucets	☐	☐	☐	☐	☐	☐
Show ers	☐	☐	☐	☐	☐	☐
Dishw ashers	☐	☐	☐	☐	☐	☐
Clothes Washers	☐	☐	☐	☐	☐	☐
Process	☐	☐	☐	☐	☐	☐
itchen Spray Rinse	☐	☐	☐	☐	☐	☐
Internal Leakage	☐	☐	☐	☐	☐	☐
Baths	☐	☐	☐	☐	☐	☐
Other	☐	☐	☐	☐	☐	☐
Irrigation	☒	☒	☒	☒	☒	☒
Pools	☐	☐	☐	☐	☐	☐
Wash Dow n	☐	☐	☐	☐	☐	☐
Car Washing	☐	☐	☐	☐	☐	☐
External Leakage	☐	☐	☐	☐	☐	☐
Outdoor	☐	☐	☐	☐	☐	☐
Cooling	☐	☐	☐	☐	☐	☐

Comments

Utility costs assumes \$0.5 per sf per site with an max of 5,000 square-feet replacement reimbursement (per Santa Rosa's current program). Customer costs include incremental landscape square-footage development costs and installation costs. Possible allow permeable landscape.

Savings assume more than 50% of turf replaced with low water-using plants.

Results	
Average Water Savings (mgd)	
0.002598	
Lifetime Savings - Present Value (\$)	
Utility	\$74,390
Community	\$74,390
Lifetime Costs - Present Value (\$)	
Utility	\$97,710
Community	\$699,005
Benefit to Cost Ratio	
Utility	0.76
Community	0.11
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$3,961

End Use Savings Per Replacement	
	% Savings per Account
MF Irrigation	25.0%
COM Irrigation	25.0%
INST Irrigation	25.0%
IRRMF Irrigation	25.0%
IRR Irrigation	25.0%

Targets	
Target Method	Percentage
% of Accts Targeted / yr	0.500%
Only Effects New Accts	☐

Costs			
Year	Utility	Customer	Total
2015	\$10,879	\$66,950	\$77,829
2016	\$10,943	\$67,345	\$78,288
2017	\$11,008	\$67,739	\$78,747
2018	\$11,072	\$68,134	\$79,205
2019	\$11,136	\$68,528	\$79,664
2020	\$11,200	\$68,923	\$80,123

Targets						
Year	MF	COM	INST	IRRMF	IRR	Total
2015	2	1	0	0	0	3
2016	2	1	0	0	0	3
2017	2	1	0	0	0	3
2018	2	1	0	0	0	3
2019	2	1	0	0	0	3
2020	2	1	0	0	0	3

Water Savings (mgd)	
Year	Total Savings (mgd)
2015	0.000307
2016	0.000617
2017	0.000928
2018	0.001241
2019	0.001555
2020	0.001872



Turf Removal - SF

Overview			
Name	Turf Removal - SF		
Abbr	23		
Category			
Measure Type	Standard Measure		

Time Period	
First Year	2015
Last Year	2024
Measure Length	10

Measure Life	
Permanent	☒

Fixture Costs			
	Utility	Customer	Fix/Acct
SF	\$250.00	\$2,000.00	1

Administration Costs	
Markup Percentage	30%

Description	
CONTRACTOR MEASURE: Provide a per square foot incentive to remove turf and replace with low water use plants or permeable hardscape. Rebate based on dollars per square foot removed and capped at an upper limit for single family residences.	

Customer Classes						
	SF	MF	COM	IRRMF	IRR	INST
	☒	☐	☐	☐	☐	☐

End Uses						
	SF	MF	COM	IRRMF	IRR	INST
Toilets	☐	☐	☐	☐	☐	☐
Urinals	☐	☐	☐	☐	☐	☐
Faucets	☐	☐	☐	☐	☐	☐
Showers	☐	☐	☐	☐	☐	☐
Dishwashers	☐	☐	☐	☐	☐	☐
Clothes Washers	☐	☐	☐	☐	☐	☐
Process	☐	☐	☐	☐	☐	☐
Kitchen Spray Rinse	☐	☐	☐	☐	☐	☐
Internal Leakage	☐	☐	☐	☐	☐	☐
Baths	☐	☐	☐	☐	☐	☐
Other	☐	☐	☐	☐	☐	☐
Irrigation	☒	☐	☐	☐	☐	☐
Pools	☐	☐	☐	☐	☐	☐
Wash Down	☐	☐	☐	☐	☐	☐
Car Washing	☐	☐	☐	☐	☐	☐
External Leakage	☐	☐	☐	☐	☐	☐
Outdoor	☐	☐	☐	☐	☐	☐
Cooling	☐	☐	☐	☐	☐	☐

Comments	
Utility costs assume based on Santa Rosa program, rebate is \$.50 per sf, max is \$250 and 500 sf. replacement reimbursement per Santa Rosa's current program. Santa Rosa assumes: 75% removed for residential. Customer costs include incremental landscape square-footage development costs and installation costs. Possible allow permeable landscape.	
Savings assume more than 100% of turf replaced with low water-using plants.	

Results	
Average Water Savings (mgd)	0.006140
Lifetime Savings - Present Value (\$)	
Utility	\$175,812
Community	\$175,812
Lifetime Costs - Present Value (\$)	
Utility	\$135,977
Community	\$972,762
Benefit to Cost Ratio	
Utility	1.29
Community	0.18
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$2,332

End Use Savings Per Replacement	
	% Savings per Account
SF Irrigation	15.0%

Targets	
Target Method	Percentage
% of Accts Targeted / yr	0.750%
Only Effects New Accts	☐

Costs			
	Utility	Customer	Total
2015	\$15,149	\$93,223	\$108,371
2016	\$15,236	\$93,761	\$108,997
2017	\$15,324	\$94,300	\$109,624
2018	\$15,411	\$94,839	\$110,250
2019	\$15,499	\$95,377	\$110,876
2020	\$15,586	\$95,916	\$111,502

Targets		
	SF	Total
2015	47	47
2016	47	47
2017	47	47
2018	47	47
2019	48	48
2020	48	48

Water Savings (mgd)	
	Total Savings (mgd)
2015	0.000727
2016	0.001458
2017	0.002193
2018	0.002933
2019	0.003676
2020	0.004424



Water Conserving Landscape

Overview	
Name	Water Conserving Landscape and Irrigation Codes
Abbr	24
Category	
Measure Type	Standard Measure

Time Period	
First Year	2015
Last Year	2040
Measure Length	26

Measure Life	
Permanent	☒

Fixture Costs			
	Utility	Customer	Fix/Acct
MF	\$300.00	\$1,000.00	1
COM	\$300.00	\$1,000.00	1
IRRMF	\$300.00	\$1,000.00	1
IRR	\$300.00	\$1,000.00	1
INST	\$300.00	\$1,000.00	1

Administration Costs	
Markup Percentage	25%

Description

CONTRACTOR MEASURE: Develop and enforce Water Efficient Landscape Design Standards. Standards specify that development projects subject to design review be landscaped according to climate appropriate principals, with appropriate turf ratios, plant selection, efficient irrigation systems and smart irrigation controllers. The ordinance could require certification of landscape professionals.

Customer Classes						
	SF	MF	COM	IRRMF	IRR	INST
	☒	☒	☒	☒	☒	☒

End Uses						
	SF	MF	COM	IRRMF	IRR	INST
Toilets	☒	☒	☒	☒	☒	☒
Urinals	☒	☒	☒	☒	☒	☒
Faucets	☒	☒	☒	☒	☒	☒
Showers	☒	☒	☒	☒	☒	☒
Dishwashers	☒	☒	☒	☒	☒	☒
Clothes Washers	☒	☒	☒	☒	☒	☒
Process	☒	☒	☒	☒	☒	☒
Kitchen Spray Rinse	☒	☒	☒	☒	☒	☒
Internal Leakage	☒	☒	☒	☒	☒	☒
Baths	☒	☒	☒	☒	☒	☒
Other	☒	☒	☒	☒	☒	☒
Irrigation	☒	☒	☒	☒	☒	☒
Pools	☒	☒	☒	☒	☒	☒
Wash Down	☒	☒	☒	☒	☒	☒
Car Washing	☒	☒	☒	☒	☒	☒
External Leakage	☒	☒	☒	☒	☒	☒
Outdoor	☒	☒	☒	☒	☒	☒
Cooling	☒	☒	☒	☒	☒	☒

Comments

All new accounts apply and those that require a landscape permit. Utility cost is an inspection cost. Customer cost assumes incremental cost to comply versus install typical all-turf landscape.

Results	
Average Water Savings (mgd)	
0.002098	
Lifetime Savings - Present Value (\$)	
Utility	\$57,855
Community	\$57,855
Lifetime Costs - Present Value (\$)	
Utility	\$18,205
Community	\$66,750
Benefit to Cost Ratio	
Utility	3.18
Community	0.87
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$914

End Use Savings Per Replacement	
	% Savings per Account
MF Irrigation	15.0%
COM Irrigation	15.0%
INST Irrigation	15.0%
IRRMF Irrigation	15.0%
IRR Irrigation	15.0%

Targets

Target Method	Percentage
% of Accts Targeted / yr	100.000%
Only Effects New Accts	☒

Costs			
	Utility	Customer	Total
2015	\$1,480	\$3,946	\$5,425
2016	\$1,480	\$3,946	\$5,425
2017	\$1,480	\$3,946	\$5,425
2018	\$1,480	\$3,946	\$5,425
2019	\$1,480	\$3,946	\$5,425
2020	\$1,480	\$3,946	\$5,425

Targets						
	MF	COM	INST	IRRMF	IRR	Total
2015	3	1	0	0	0	4
2016	3	1	0	0	0	4
2017	3	1	0	0	0	4
2018	3	1	0	0	0	4
2019	3	1	0	0	0	4
2020	3	1	0	0	0	4

Water Savings (mgd)	
	Total Savings (mgd)
2015	0.000217
2016	0.000434
2017	0.000651
2018	0.000868
2019	0.001085
2020	0.001302



Require Smart Irrigation Controllers

Overview	
Name	Require Smart Irrigation Controllers and
Abbr	25
Category	
Measure Type	Standard Measure

Time Period	Measure Life
First Year 2015	Permanent ☒
Last Year 2040	
Measure Length 26	

Fixture Costs			
	Utility	Customer	Fix/Acct
SF	\$100.00	\$750.00	1
MF	\$100.00	\$750.00	1
COM	\$100.00	\$750.00	3
INST	\$100.00	\$750.00	3

Administration Costs	
Markup Percentage	10%

Description
CONTRACTOR MEASURE: Require Weather Adjusting Smart Irrigation Controllers per Cal Green on New Development. It is optional to require Rain Sensors in Cal Green for New Development. Require developers for all properties of greater than four residential units and all commercial development to install the weather based irrigation controllers. May require landscaper training.

Customer Classes						
	SF	MF	COM	IRRMF	IRR	INST
	☒	☒	☒	☐	☐	☒

End Uses						
	SF	MF	COM	IRRMF	IRR	INST
Toilets	☐	☐	☐	☐	☐	☐
Urinals	☐	☐	☐	☐	☐	☐
Faucets	☐	☐	☐	☐	☐	☐
Show ers	☐	☐	☐	☐	☐	☐
Dishw ashers	☐	☐	☐	☐	☐	☐
Clothes Washers	☐	☐	☐	☐	☐	☐
Process	☐	☐	☐	☐	☐	☐
itchen Spray Rinse	☐	☐	☐	☐	☐	☐
Internal Leakage	☐	☐	☐	☐	☐	☐
Baths	☐	☐	☐	☐	☐	☐
Other	☐	☐	☐	☐	☐	☐
Irrigation	☒	☒	☒	☐	☒	☐
Pools	☐	☐	☐	☐	☐	☐
Wash Down	☐	☐	☐	☐	☐	☐
Car Washing	☐	☐	☐	☐	☐	☐
External Leakage	☐	☐	☐	☐	☐	☐
Outdoor	☐	☐	☐	☐	☐	☐
Cooling	☐	☐	☐	☐	☐	☐

Comments	
Customer cost assumes \$700 device unit cost (per RainBird ITC-LX) and \$50 unit installation cost per controller with 3 controllers needed for large sites. Utility cost reflects inspection costs.	
Savings used in BAWSCA analysis. Valencia Water Company weather-based irrigation controller pilot study in 2014 concluded 15% irrigation savings.	

Results	
Average Water Savings (mgd)	
0.007021	
Lifetime Savings - Present Value (\$)	
Utility	\$193,755
Community	\$193,755
Lifetime Costs - Present Value (\$)	
Utility	\$56,394
Community	\$440,897
Benefit to Cost Ratio	
Utility	3.44
Community	0.44
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$846

End Use Savings Per Replacement	
	% Savings per Account
SF Irrigation	15.0%
MF Irrigation	15.0%
COM Irrigation	15.0%
INST Irrigation	15.0%

Targets	
Target Method	Percentage
% of Accts Targeted / yr	100.000%
Only Effects New Accts	☒

Costs			
Year	Utility	Customer	Total
2015	\$4,634	\$31,595	\$36,229
2016	\$4,634	\$31,595	\$36,229
2017	\$4,634	\$31,595	\$36,229
2018	\$4,634	\$31,595	\$36,229
2019	\$4,634	\$31,595	\$36,229
2020	\$4,634	\$31,595	\$36,229

Targets					
Year	SF	MF	COM	INST	Total
2015	36	3	1	0	40
2016	36	3	1	0	40
2017	36	3	1	0	40
2018	36	3	1	0	40
2019	36	3	1	0	40
2020	36	3	1	0	40

Water Savings (mgd)	
Year	Total Savings (mgd)
2015	0.000734
2016	0.001467
2017	0.002201
2018	0.002934
2019	0.003668
2020	0.004402

APPENDIX E - LIST OF CONTACTS

The following table presents each Water Contractor's contact information.

Water Contractor	Name	Phone Number	E-mail	Role
City of Cotati	Damien O'Bid	707-665-3620	dobid@cotaticity.org	City Engineer/Public Works Director
City of Petaluma	Nick Crump	707-778-4487	ncrump@ci.petaluma.ca.us	Environmental Services Technician
	Leah Walker	707-778-4583	lwalker@ci.petaluma.ca.us	Environmental Services Manager
City of Rohnert Park	Mary Grace Pawson	707-588-2234	mpawson@rpcity.org	City Engineer
City of Santa Rosa	Rocky Vogler	707-543-3938	rvogler@srcity.org	Senior Water Resources Planner
	Teresa Gudino	707-543-3942	tgudino@srcity.org	Water Resources Analyst
City of Sonoma	Dan Takasugi	707-933-2230	dtakasugi@sonomacity.org	City Engineer/Public Works Director
	Steve MacCarthy	707-933-2231	steve@sonomacity.org	Water System Supervisor
	Mike Brett	707-933-2247	mbrett@sonomacity.org	Water Conservation Specialist
Marin Municipal Water District	Carl Gowan	415-945-1577	cgowan@marinwater.org	Principal Engineer
	Mike Ban	415-945-1435	mban@marinwater.org	Environmental & Engineering Services Manager
	Oreen Delgado	415-945-1425	odelgado@marinwater.org	Finance Manager
	Dan Carney	415-945-1522	dcarney@marinwater.org	Water Conservation Manager
	Alex Anaya	415-945-1588	aanaya@marinwater.org	Engineering Technician
	Lucy Croy	415-945-1590	lcroy@marinwater.org	Assistant Engineer
North Marin Water District	Chris DeGabriele	415-761-8905	cdegrabriele@nmwd.com	General Manager
	Ryan Grisso	415-761-8933	rgrisso@nmwd.com	Water Conservation Coordinator
	Drew McIntyre	415-761-8912	drewm@nmwd.com	Chief Engineer
Town of Windsor	James M Smith	707-838-5343	jmsmith@Townofwindsor.com	Senior Civil Engineer
	Paul Piazza	707-838-5357	ppiazza@Townofwindsor.com	Management Analyst/ Water Conservation Analyst
	Toni Bertolero	707-838-5978	tbertolero@townofwindsor.com	Town Engineer/Public Works Director
	Mike Cave	707-838-5329	mcave@townofwindsor.com	Utility Systems Superintendent

Water Contractor	Name	Phone Number	E-mail	Role
Valley of the Moon Water District	Daniel Muelrath	707-996-1037	draelrath@vomwd.com	General Manager
	Shari Walk	707-996-1037	swalk@vomwd.com	Admin & Finance Manager
Maddaus Water Management	Michelle Maddaus	925-831-0194	michelle@maddauswater.com	MWM Project Manager

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**APPENDIX D:
AWWA WATER LOSS SPREADSHEET (2015)**



AWWA Free Water Audit Software: Reporting Worksheet

WAS v5.0

American Water Works Association

? Click to access definition
+ Click to add a comment

Water Audit Report for: **Valley of the Moon Water District**
Reporting Year: **2014-2015** **7/2014 - 6/2015**

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the

All volumes to be entered as: **MILLION GALLONS (US) PER YEAR**

To select the correct data grading for each input, determine the highest grade where

WATER SUPPLIED

<----- Enter grading in column 'E' and 'J' ----->
Volume from own sources: + ? 7 183.394 MG/Yr
Water imported: + ? 10 634.287 MG/Yr
Water exported: + ? 0.000 MG/Yr

Master Meter and Supply Error Adjustments

Pcnt: Value:
+ ? 3 2.00% 0 0 MG/Yr
+ ? 10 2.00% 0 0 MG/Yr
+ ? 0 0 0 MG/Yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: 801.648 MG/Yr

AUTHORIZED CONSUMPTION

Billed metered: + ? 10 749.390 MG/Yr
Billed unmetered: + ? n/a 0.000 MG/Yr
Unbilled metered: + ? 10 0.770 MG/Yr
Unbilled unmetered: + ? 10 10.221 MG/Yr

Unbilled Unmetered volume entered is greater than the recommended default value

AUTHORIZED CONSUMPTION: 760.381 MG/Yr

Click here: ?
for help using option
buttons below

Pcnt: Value:
0 0 10.221 MG/Yr

Use buttons to select
percentage of water
supplied
OR
value

Pcnt: Value:
0.25% 0 0 MG/Yr

2.00% 0 0 MG/Yr
0.25% 0 0 MG/Yr

WATER LOSSES (Water Supplied - Authorized Consumption)

Apparent Losses

Unauthorized consumption: + ? 2.004 MG/Yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies: + ? 10 15.309 MG/Yr

Systematic data handling errors: + ? 1.873 MG/Yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: 19.187 MG/Yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: ? 22.080 MG/Yr

WATER LOSSES: 41.267 MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER: 52.258 MG/Yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains: + ? 7 92.0 miles
Number of active AND inactive service connections: + ? 8 7,093
Service connection density: ? 77 conn./mile main

Are customer meters typically located at the curbside or property line? Select...
Average length of customer service line: + ? 10 20.0 ft (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average operating pressure: + ? 8 65.0 psi

COST DATA

Total annual cost of operating water system: + ? 10 \$3,538,928 \$/Year
Customer retail unit cost (applied to Apparent Losses): + ? 10 \$5.58 \$/1000 gallons (US)
Variable production cost (applied to Real Losses): + ? 10 \$2,434.36 \$/Million gallons ☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

*** YOUR SCORE IS: 92 out of 100 ***

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Unauthorized consumption

2: Systematic data handling errors

3: Volume from own sources



**APPENDIX E:
SBX7-7 COMPLIANCE**

SB X7-7 Table 0: Units of Measure Used in UWMP*
(select one from the drop down list)

Acre Feet

**The unit of measure must be consistent with Table 2-3*

NOTES:

SB X7-7 Table-1: Baseline Period Ranges

Baseline	Parameter	Value	Units
10- to 15-year baseline period	2008 total water deliveries	3,329	Acre Feet
	2008 total volume of delivered recycled water	-	Acre Feet
	2008 recycled water as a percent of total deliveries	0.00%	Percent
	Number of years in baseline period ^{1, 2}	10	Years
	Year beginning baseline period range	1995	
	Year ending baseline period range ³	2004	
5-year baseline period	Number of years in baseline period	5	Years
	Year beginning baseline period range	2003	
	Year ending baseline period range ⁴	2007	
¹ If the 2008 recycled water percent is less than 10 percent, then the first baseline period is a continuous 10-year period. If the amount of recycled water delivered in 2008 is 10 percent or greater, the first baseline period is a continuous 10- to 15-year period.			
² The Water Code requires that the baseline period is between 10 and 15 years. However, DWR recognizes that some water suppliers may not have the minimum 10 years of baseline data.			
³ The ending year must be between December 31, 2004 and December 31, 2010.			
⁴ The ending year must be between December 31, 2007 and December 31, 2010.			
NOTES:			

SB X7-7 Table 2: Method for Population Estimates**Method Used to Determine Population**
(may check more than one)☐**1. Department of Finance (DOF)**DOF Table E-8 (1990 - 2000) and (2000-2010) and
DOF Table E-5 (2011 - 2015) when available☒**2. Persons-per-Connection Method**☐**3. DWR Population Tool**☐**4. Other**

DWR recommends pre-review

NOTES:

SB X7-7 Table 3: Service Area Population		
Year		Population
10 to 15 Year Baseline Population		
Year 1	1995	20,337
Year 2	1996	20,625
Year 3	1997	20,887
Year 4	1998	21,179
Year 5	1999	21,432
Year 6	2000	21,658
Year 7	2001	21,853
Year 8	2002	22,006
Year 9	2003	22,237
Year 10	2004	22,422
Year 11		
Year 12		
Year 13		
Year 14		
Year 15		
5 Year Baseline Population		
Year 1	2003	22,237
Year 2	2004	22,422
Year 3	2005	22,913
Year 4	2006	23,127
Year 5	2007	23,239
2015 Compliance Year Population		
2015		23,782
NOTES: Population interpolated between census		

SB X7-7 Table 4: Annual Gross Water Use *

Baseline Year <i>Fm SB X7-7 Table 3</i>		Volume Into Distribution System <i>This column will remain blank until SB X7-7 Table 4-A is completed.</i>	Deductions					Annual Gross Water Use
			Exported Water	Change in Dist. System Storage (+/-)	Indirect Recycled Water <i>This column will remain blank until SB X7-7 Table 4-B is completed.</i>	Water Delivered for Agricultural Use	Process Water <i>This column will remain blank until SB X7-7 Table 4-D is completed.</i>	
10 to 15 Year Baseline - Gross Water Use								
Year 1	1995	3,216			-		-	3,216
Year 2	1996	3,452			-		-	3,452
Year 3	1997	3,146			-		-	3,146
Year 4	1998	3,518			-		-	3,518
Year 5	1999	3,545			-		-	3,545
Year 6	2000	3,526			-		-	3,526
Year 7	2001	3,445			-		-	3,445
Year 8	2002	3,394			-		-	3,394
Year 9	2003	3,576			-		-	3,576
Year 10	2004	3,298			-		-	3,298
<i>Year 11</i>	0	-			-		-	-
<i>Year 12</i>	0	-			-		-	-
<i>Year 13</i>	0	-			-		-	-
<i>Year 14</i>	0	-			-		-	-
<i>Year 15</i>	0	-			-		-	-
10 - 15 year baseline average gross water use								3,411
5 Year Baseline - Gross Water Use								
Year 1	2003	3,576			-		-	3,576
Year 2	2004	3,298			-		-	3,298
Year 3	2005	3,424			-		-	3,424
Year 4	2006	3,484			-		-	3,484
Year 5	2007	3,339			-		-	3,339
5 year baseline average gross water use								3,424

SB X7-7 Table 4: Annual Gross Water Use *							
Baseline Year <i>Fm SB X7-7 Table 3</i>	Volume Into Distribution System <i>This column will remain blank until SB X7-7 Table 4-A is completed.</i>	Deductions					Annual Gross Water Use
		Exported Water	Change in Dist. System Storage (+/-)	Indirect Recycled Water <i>This column will remain blank until SB X7-7 Table 4-B is completed.</i>	Water Delivered for Agricultural Use	Process Water <i>This column will remain blank until SB X7-7 Table 4-D is completed.</i>	
2015 Compliance Year - Gross Water Use							
2015	2,528	-		-		-	2,528
* NOTE that the units of measure must remain consistent throughout the UWMP, as reported in Table 2-3							
NOTES:							

SB X7-7 Table 4-A: Volume Entering the Distribution System(s)

Complete one table for each source.

Name of Source	Sonoma County Water Agency			
This water source is:				
☐	The supplier's own water source			
☒	A purchased or imported source			
Baseline Year <i>Fm SB X7-7 Table 3</i>	Volume Entering Distribution System	Meter Error Adjustment* <i>Optional (+/-)</i>	Corrected Volume Entering Distribution System	
10 to 15 Year Baseline - Water into Distribution System				
Year 1	1995	3,144		3,144
Year 2	1996	3,054		3,054
Year 3	1997	2,730		2,730
Year 4	1998	3,000		3,000
Year 5	1999	2,817		2,817
Year 6	2000	2,865		2,865
Year 7	2001	2,886		2,886
Year 8	2002	2,879		2,879
Year 9	2003	3,157		3,157
Year 10	2004	2,916		2,916
Year 11	0			-
Year 12	0			-
Year 13	0			-
Year 14	0			-
Year 15	0			-
5 Year Baseline - Water into Distribution System				
Year 1	2003	3,157		3,157
Year 2	2004	2,916		2,916
Year 3	2005	3,062		3,062
Year 4	2006	3,150		3,150
Year 5	2007	2,926		2,926
2015 Compliance Year - Water into Distribution System				
2015	1,947			1,947
* Meter Error Adjustment - See guidance in Methodology 1, Step 3 of Methodologies Document				
NOTES:				

SB X7-7 Table 4-A: Volume Entering the Distribution

Name of Source	District Groundwater			
This water source is:				
☒	The supplier's own water source			
☐	A purchased or imported source			
Baseline Year <i>Fm SB X7-7 Table 3</i>	Volume Entering Distribution System	Meter Error Adjustment* <i>Optional</i> (+/-)	Corrected Volume Entering Distribution System	
10 to 15 Year Baseline - Water into Distribution System				
Year 1	1995	72		72
Year 2	1996	398		398
Year 3	1997	416		416
Year 4	1998	518		518
Year 5	1999	727		727
Year 6	2000	661		661
Year 7	2001	559		559
Year 8	2002	515		515
Year 9	2003	419		419
Year 10	2004	383		383
Year 11	-			0
Year 12	-			0
Year 13	-			0
Year 14	-			0
Year 15	-			0
5 Year Baseline - Water into Distribution System				
Year 1	2003	419		419
Year 2	2004	383		383
Year 3	2005	362		362
Year 4	2006	335		335
Year 5	2007	413		413
2015 Compliance Year - Water into Distribution System				
2015	581			581
<i>* Meter Error Adjustment - See guidance in Methodology 1, Step 3 of Methodologies Document</i>				
NOTES:				

SB X7-7 Table 5: Gallons Per Capita Per Day (GPCD)

Baseline Year <i>Fm SB X7-7 Table 3</i>		Service Area Population <i>Fm SB X7-7 Table 3</i>	Annual Gross Water Use <i>Fm SB X7-7 Table 4</i>	Daily Per Capita Water Use (GPCD)
10 to 15 Year Baseline GPCD				
Year 1	1995	20,337	3,216	141
Year 2	1996	20,625	3,452	149
Year 3	1997	20,887	3,146	134
Year 4	1998	21,179	3,518	148
Year 5	1999	21,432	3,545	148
Year 6	2000	21,658	3,526	145
Year 7	2001	21,853	3,445	141
Year 8	2002	22,006	3,394	138
Year 9	2003	22,237	3,576	144
Year 10	2004	22,422	3,298	131
<i>Year 11</i>	0	-	-	
<i>Year 12</i>	0	-	-	
<i>Year 13</i>	0	-	-	
<i>Year 14</i>	0	-	-	
<i>Year 15</i>	0	-	-	
10-15 Year Average Baseline GPCD				142
5 Year Baseline GPCD				
Baseline Year <i>Fm SB X7-7 Table 3</i>		Service Area Population <i>Fm SB X7-7 Table 3</i>	Gross Water Use <i>Fm SB X7-7 Table 4</i>	Daily Per Capita Water Use
Year 1	2003	22,237	3,576	144
Year 2	2004	22,422	3,298	131
Year 3	2005	22,913	3,424	133
Year 4	2006	23,127	3,484	135
Year 5	2007	23,239	3,339	128
5 Year Average Baseline GPCD				134
2015 Compliance Year GPCD				
2015		23,782	2,528	95
NOTES:				

SB X7-7 Table 6: Gallons per Capita per Day
Summary From Table SB X7-7 Table 5

10-15 Year Baseline GPCD	142
5 Year Baseline GPCD	134
2015 Compliance Year GPCD	95
NOTES:	

SB X7-7 Table 7: 2020 Target Method*Select Only One*

Target Method		Supporting Documentation
☐	Method 1	SB X7-7 Table 7A
☐	Method 2	SB X7-7 Tables 7B, 7C, and 7D <i>Contact DWR for these tables</i>
☒	Method 3	SB X7-7 Table 7-E
☐	Method 4	Method 4 Calculator

NOTES:

SB X7-7 Table 7-E: Target Method 3

Agency May Select More Than One as Applicable	Percentage of Service Area in This Hydrological Region	Hydrologic Region	"2020 Plan" Regional Targets	Method 3 Regional Targets (95%)
☐		North Coast	137	130
☐		North Lahontan	173	164
☐		Sacramento River	176	167
☒	100%	San Francisco Bay	131	124
☐		San Joaquin River	174	165
☐		Central Coast	123	117
☐		Tulare Lake	188	179
☐		South Lahontan	170	162
☐		South Coast	149	142
☐		Colorado River	211	200
Target <i>(If more than one region is selected, this value is calculated.)</i>				124
NOTES:				

SB X7-7 Table 7-F: Confirm Minimum Reduction for 2020 Target

5 Year Baseline GPCD <i>From SB X7-7 Table 5</i>	Maximum 2020 Target ¹	Calculated 2020 Target ²	Confirmed 2020 Target
134	127	124	124

¹ Maximum 2020 Target is 95% of the 5 Year Baseline GPCD ² 2020
Target is calculated based on the selected Target Method, see SB X7-7 Table 7 and
corresponding tables for agency's calculated target.

NOTES:

SB X7-7 Table 8: 2015 Interim Target GPCD		
Confirmed 2020 Target <i>Fm SB X7-7 Table 7-F</i>	10-15 year Baseline GPCD <i>Fm SB X7-7 Table 5</i>	2015 Interim Target GPCD
124	142	133
NOTES:		

SB X7-7 Table 9: 2015 Compliance

Actual 2015 GPCD	2015 Interim Target GPCD	Optional Adjustments <i>(in GPCD)</i>					2015 GPCD <i>(Adjusted if applicable)</i>	Did Supplier Achieve Targeted Reduction for 2015?
		Enter "0" if Adjustment Not Used			TOTAL Adjustments	Adjusted 2015 GPCD		
		Extraordinary Events	Weather Normalization	Economic Adjustment				
95	133	<i>From Methodology 8 (Optional)</i>	<i>From Methodology 8 (Optional)</i>	<i>From Methodology 8 (Optional)</i>	-	95	95	YES

NOTES:



**APPENDIX F:
REGIONAL ALLIANCE SBX7-7 COMPLIANCE**

SB X7-7 RA1 - Weighted Baseline

Participating Member Agency Name	10-15 year Baseline GPCD*	Average Population During 10-15 Year Baseline Period	(Baseline GPCD) X (Population)	Regional Alliance Weighted Average 10-15 Year Baseline GPCD
City of Cotati	159	6,559	1,043,146	
Marin Municipal Water District	149	178,670	26,690,318	
North Marin Water District	173	54,061	9,370,435	
City of Petaluma	180	52,622	9,491,997	
City of Rohnert Park	161	40,811	6,582,847	
City of Santa Rosa	145	143,109	20,806,963	
City of Sonoma	225	9,679	2,173,212	
Valley of the Moon Water Distict	146	20,969	3,058,648	
Town of Windsor	156	24,572	3,834,809	
Regional Alliance Total	1,495	531,051	83,052,375	156

**All participating agencies must submit individual SB X7-7 Tables, as applicable, showing the individual agency's calculations. These tables are: SB X7-7 Tables 0 through 6 , Table 7, any required supporting tables (as stated in SB X7-7 Table 7), and SB X7-7 Table 9, as applicable. These individual agency tables will be submitted with the individual or Regional Urban Water Management Plan.*

NOTES

SB X7-7 RA1 - Weighted 2020 Target				
Participating Member Agency Name	2020 Target GPCD*	2015 Population	(Target) X (Population)	Regional Alliance Weighted Average 2020 Target
City of Cotati	130	7,288	947,440	
Marin Municipal Water District	124	189,000	23,436,000	
North Marin Water District	139	61,381	8,531,959	
City of Petaluma	141	61,798	8,713,518	
City of Rohnert Park	119	41,675	4,959,325	
City of Santa Rosa	126	173,071	21,806,946	
City of Sonoma	180	11,147	2,006,460	
Valley of the Moon Water District	124	23,478	2,911,272	
Town of Windsor	130	27,486	3,573,180	
Regional Alliance Total	1,213	596,324	76,886,100	129
<i>*All participating agencies must submit individual SB X7-7 Tables, as applicable, showing the individual agency's calculations. These tables are: SB X7-7 Tables 0 through 6, Table 7, any required supporting tables (as stated in SB X7-7 Table 7), and SB X7-7 Table 9, as applicable. These individual agency tables will be submitted with the individual or Regional Urban Water Management Plan.</i>				
NOTES				

SB X7-7 RA1 - 2015 Target		
Weighted Average 10-15 year Baseline GPCD	Weighted Average 2020 Target	Regional Alliance 2015 Interim Target
156	129	143
NOTES		

SB X7-7 RA1 - 2015 GPCD (Actual)

Participating Member Agency Name	2015 Actual GPCD ¹	2015 Population	(2015 GPCD) X (2015 Population)	Regional Alliance GPCD (Actual) 2015
City of Cotati	93	7,288	679,016	
Marin Municipal Water District	110	189,000	20,715,583	
North Marin Water District	105	61,381	6,461,073	
City of Petaluma	110	61,798	6,823,500	
City of Rohnert Park	91	41,675	3,775,789	
City of Santa Rosa	85	173,071	14,765,037	
City of Sonoma	141	11,147	1,573,338	
Valley of the Moon Water District	90	23,478	2,117,236	
Town of Windsor	99	27,486	2,720,608	
Regional Alliance Totals	925	596,324	59,631,180	100

** All participating agencies must submit individual SB X7-7 Tables, as applicable, showing the individual agency's calculations. These tables are: SB X7-7 Tables 0 through 6, Table 7, any required supporting tables (as stated in SB X7-7 Table 7), and SB X7-7 Table 9, as applicable. These individual agency tables will be submitted with the individual or Regional Urban Water Management Plan.*

NOTES

SB X7-7 RA1 - Compliance Verification

2015 GPCD (Actual)	2015 Interim Target GPCD	Economic Adjustment ¹ <i>Enter "0" if no adjustment</i>	Adjusted 2015 GPCD <i>(if economic adjustment used)</i>	Did Alliance Achieve Targeted Reduction for 2015?
100	143	0	100	YES
¹ Adjustments for economic growth can be applied to either the individual supplier's data or to the aggregate regional alliance data (but not both), depending upon availability of suitable data and methods.				
NOTES				

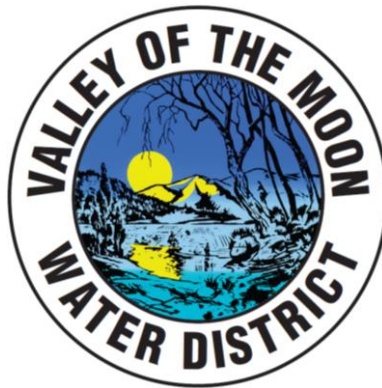


**APPENDIX G:
2015 WATER SHORTAGE CONTINGENCY PLAN**

Valley of the Moon Water District

Urban Water Shortage Contingency Plan

2015



**VALLEY OF THE MOON WATER DISTRICT
URBAN WATER SHORTAGE CONTINGENCY PLAN 2015
TABLE OF CONTENTS**

Section 1: Introduction.....	3
Section 2: Water Supply and Production.....	3
Section 3: Past, Current and Projected Demand	4
<i>Table 1 – Customer Class Demand</i>	<i>4</i>
Section 4: Stages of Action for Demand Management.....	4
4.1 Allocation Priorities	5
4.2 Stages of Action and Demand Reduction Strategies	5
<i>Table II – Stages of Action and Demand Reduction Goals</i>	<i>5</i>
<i>Table III – Average Year Demand (AF) and Reduction Goals in Shortage Stages.....</i>	<i>6</i>
<i>Table IV – Single Family Residential Gallons per Capita per Day</i>	<i>6</i>
4.3 Prohibitions on Water Waste	8
4.4 Violations of Water Use Restrictions and Repeated Excess Use	9
4.5 Variance Procedures	9
Section 5: Analysis of Revenue and Expenditure Impacts	10
5.1 Water Shortage Rate Structure.....	10
<i>Table V – Water Shortage Charges</i>	<i>11</i>
5.2 Projected Revenues and Expenditures	11
<i>Table VI – Impact of Water Shortage on Revenues and Expenditures.....</i>	<i>11</i>
<i>Table VII – Water Bill Impacts for Customer Meeting Reduction Goal.....</i>	<i>12</i>
<i>Table VIII – Water Bill Impacts for Customer Not Meeting Reduction Goal</i>	<i>12</i>
Section 6: Implementation of the Plan.....	12
Section 7: Monitoring Procedures	12
Section 8: Public Noticing and Adoption	13
Appendix1: Valley of the Moon Water District – Water Shortage Action Plan 2015 (summary table)	
Appendix 2: Draft Water Shortage Emergency Resolution	
Appendix 3: California Water Code Section 10632	

VALLEY OF THE MOON WATER DISTRICT

URBAN WATER SHORTAGE CONTINGENCY PLAN - 2015 UPDATE

Section 1: Introduction

The Valley of the Moon Water District (District) Urban Water Shortage Contingency Plan (UWSCP) was first adopted on January 21, 1992, in response to California Assembly Bill 11X (1991). Legislation has changed the requirements of urban water shortage contingency planning several times since the initial bill. Current requirements are in Section 10632 of the Urban Water Management Planning part of the California Water Code, which is provided as Appendix 3 to this document.

The District's initial Plan was revised in 1996, 1998, 1999, 2005 and 2014. This 2015 revision is performed to include the District's new 4th tier for residential billing and provide minor modifications to the water shortage stages based on the actual implementation of this plan and water shortage charges during FY 14/15.

The updated Plan gives the District additional flexibility to address supply shortfalls that may result from, but are not limited to: droughts, extreme weather events, natural disasters, extended power outages, reduced deliveries from the Sonoma County Water Agency (SCWA), regulatory droughts and other water shortage conditions.

Section 2: Water Supply and Production

The District's primary source of water supply during normal water supply conditions is SCWA, which delivers water imported from the Russian River and accounts for 84% of the District's supplies with the remaining 16% being supplied from District wells. Under the Restructured Agreement for Water Supply between SCWA and its contractors (including the District) that was entered into in 2006, the District is entitled to delivery of water at a rate of 8.5 million gallons per day, peak month average, with an annual volume limit of 3,200 acre feet. The District provides water to approximately 6,900 connections, with an annual average fiscal year (FY) total water production of 2,923 acre feet (AF)¹. This is approximately 2,450 AF from SCWA and 470 AF from local well production.

In recent years (2007 and 2008) there were short term drought based water supply shortages resulting in SCWA requesting a 15% voluntary reduction from its contractors. In 2009, SCWA implemented the Water Shortage Allocation Methodology during the summer that reduced the normal amount of water the District receives. Until 2014 the District had not activated the Urban

¹ Based on three year average of FY 2012/13 – 2014-15

Water Shortage Contingency Plan and instead relied on Board Resolutions and community outreach and participation to successfully achieve required reductions. In 2014 and 2015 due to an ongoing drought that started in 2012 the State Water Resources Control mandated statewide conservation targets that were not based on local water supply condition which resulted in the District having to activate their UWSCP. Due to rainfall during the winter of 2014/15 the District's water supplies were better entering the 4th year of the drought than during the previous year signally the resiliency of the Russian River system.

In addition, based on the 2010 Urban Water Management Plan in a multiply dry year analysis there is no projected water supply shortage for the District. However, under a historic single dry year the analysis was based on the Agency being able to supply 30% less water than under normal circumstances. In this event, per the 2006 Restructured Agreement for Water Supply, the Water Shortage Allocation Methodology would be applied resulting in a shortfall of normal supply to the District. This scenario may require the District to implement its Urban Water Shortage Contingency Plan.

Section 3: Past, Current and Projected Demand

Due to the economic recession of the late 2000's and the current 5 year drought the demand analysis is based on the estimated average demand for District customers during a normal non-drought time period.

Table I - Customer Class Demand (in acre-feet)

Customer Class	Number of Active Connections FY 2015/16	Demand Acre Feet (1)
Single Family Residential	6,215	1,842
Multiple Family Residential	437	525
Commercial/Industrial/Institutional	201	299
Dedicated Irrigation	32	53
Total	6,885	2,719

(1) Total Demand is lower than total production (SCWA purchases + well production) due to fire protection, hydrant flushing, system water loss, etc.

Section 4: Stages of Action for Demand Management

Water Code section 10632 requires the District to provide a water shortage contingency analysis that identifies demand reduction strategies that will be employed at all stages of a water shortage, including up to a 50% reduction in available water supply. This Section includes:

- *Allocation Priorities*
- *Stages of Action and Demand Reduction Strategies*
- *Prohibitions on Water Waste*
- *Violations of Water Use Restrictions and Repeated Excess Use*
- *Variance Procedures*

The entire strategy for demand reduction is summarized in Appendix 1 of this Plan, and is based upon and adopted pursuant to the provisions of Water Code section 10632.

In the event of a water shortage, the District's Board of Directors shall conduct at least one publicly noticed hearing at which the General Manager shall present a summary of the current water supply conditions, the anticipated water demands by District customers, and the General Manager's recommendations for actions to be taken by the Board in light of the totality of the circumstances.

If the Board finds and determines that there is a water shortage, it will at that time adopt a resolution, substantially in the form in Appendix 2 of this Plan, to declare the existence of a water shortage and to establish the Stage of Action and Demand Reduction Goals in accordance with the following provisions of this Section of the Plan.

4.1 Allocation Priorities

Overall demand reduction will be achieved with different reduction goals in each user class. The following priorities have been established for use in developing demand reduction programs and allocations during a water shortage. Priorities for use of available water, from highest to lowest priority are:

- Health and Human Safety, including non-landscaping residential use
- Commercial, Industrial and Institutional
- Existing Landscaping
- New Demand – projects without executed District application/agreement and full payment of District fees when shortage is declared

4.2 Stages of Action and Demand Reduction Strategies

The District has determined the following increasingly stringent stages of action for responding to reduced supply in a water shortage:

Table II - Stages of Action and Demand Reduction Goals

Supply Shortage	Action Stage	Overall Demand Reduction Goal	Program Type
Up to 25%	Stage 1 - Minimal	Up to 25%	Voluntary
Up to 25%	Stage 2 - Moderate	25%	Mandatory
26% - 35%	Stage 3 - Severe	35%	Mandatory
36% - 50%	Stage 4 - Critical	50%	Mandatory

With the allocation priorities set forth in section 4.1, Table – III details overall reduction goals by customer class for Stages 2, 3 and 4. Reduction goals for single-family and multi-family customers are based on per capita water allocation, plus an irrigation allocation (as further described below). Commercial, industrial and institutional customer classes demand reduction is based on prior year demand. For dedicated irrigation accounts, the allocation is based on evapotranspiration data. Table – IV then provides an example of how the allocations would affect the District’s largest customer class, Single Family Residential.

Table III - Average Year Demand (AF) and Reduction Goals in Shortage Stages

Customer Class	Estimated Average Demand	Stage 2 Allocation	Reduction Goal (%)	Stage 3 Allocation	Reduction Goal (%)	Stage 4 Allocation	Reduction Goal (%)
Single Family Residential	1,842	1,382	25%	1,190	35%	829	55%
Multiple Family Residential	525	392	25%	339	35%	305	42%
Commercial / Industrial / Institutional	299	253	15%	238	20%	218	27%
Dedicated Irrigation	53	27	50%	13	75%	5	90%
Total	2,719	2,053	25%	1,780	35%	1,357	50%

Table IV - Single Family Residential Gallons per Capita per Day

	Estimated Average Demand	Stage 2 (25% Reduction)	Stage 3 (35% Reduction)	Stage 4 (50% Reduction)
Single Family Residential – Active connections	6,215	6,215	6,215	6,215
Average no. of people per household	2.56	2.56	2.56	2.56
Single family population	15,910	15,910	15,910	15,910
Gallons Per Capita Day	59	59	59	46.5
Health & Human (acre-feet)	1,051	1,051	1,051	829
Irrigation allocation (gallons)		3,000	1,250	0
Total Irrigation (acre-feet)	791	331	139	0
Total SF demand (acre-feet)	1,842	1,382	1,190	829

Details of reduction strategies at each action stage are as follows:

Stage 1: Voluntary program with a community-wide reduction goal of up to 25% to be achieved by implementing the following strategies:

- Implementation of Best Management Practices
- Eliminate waste and leaks
- Minimization of non-essential uses
- “Water-on-request” restaurant program

Stage 2: Mandatory program with the goal of 25% overall reduction to be achieved by implementing the following additional strategies:

- Single-family customers receive up to 59 gpcd plus a moderate landscape allotment of 3,000 gallons per month per account from May through October
- Multi-family customers receive up to 59 gpcd plus 50% historical net evapotranspiration-based demand for the square footage of the irrigated area from May through October (if irrigation is not served by a separate meter).
- Commercial/Industrial/Institutional accounts receive 85% of their historical water use in the most recent 12-month period during which no water shortage demand reduction program was in place.
- Dedicated irrigation accounts receive a water budget based on 50% historical net evapotranspiration-based demand for the square footage of the irrigated area.
- Hospitals receive 95% of their historical water use in the most recent 12 month period during which no water shortage demand reduction program was in place.

Stage 3: Mandatory program with the goal of 35% overall reduction to be achieved by implementing the following strategies:

- Single-family customers receive up to 59 gpcd plus a minimal landscape allotment of 1,250 gallons per month per account from May through October
- Multi-family customers receive up to 59 gpcd plus 25% historical net evapotranspiration-based demand for the square footage of the irrigated area from May through October (if irrigation is not served by a separate meter).
- Commercial/Industrial/Institutional accounts receive 80% of their historical water use in the most recent 12-month period during which no water shortage demand reduction program was in place.
- Dedicated irrigation accounts receive a water budget based on 25% historical net evapotranspiration-based demand for the square footage of the irrigated area.
- Hospitals receive 90% of their historical water use in the most recent 12 month period during which no water shortage demand reduction program was in place.
-

Stage 4: Mandatory program with the goal of 50% overall reduction to be achieved by implementing the following strategies:

- Single-family customers receive up to 46.5 gpcd with zero gallons per month landscape allotment.
- Multi-family customers receive up to 46.5 gpcd with zero gallons per month landscape allotment.
- Commercial/Industrial/Institutional accounts receive 73% of their historical water use in the most recent 12-month period during which no water shortage demand reduction program was in place.
- Dedicated irrigation accounts receive a water budget based on 10% historical net evapotranspiration-based demand for the square footage of the irrigated area
- Hospitals receive 85% of their historical water use in the most recent 12 month period during which no water shortage demand reduction program was in place.

4.3 Prohibitions on Water Waste

- The District adopted Water Waste Ordinance No. 1007 in 2000 which prohibits, among other things, the following: Irrigation in such a manner that water runs off or over-sprays the irrigated area
- Leaks that are known to the customer but which are not repaired

Board Resolution No. 150401 was adopted to include the following days per week irrigation restrictions:

Stage 2 – 3 days per week or less

Stage 3 – 2 days per week or less

Stage 4 – 1 day per week or less.

In addition to the prohibitions in Ordinance No. 1007 and Resolution No. 150401, the following water uses are prohibited during a water shortage condition:

Stage 1

- Use of any garden or utility hose without a hose-end shut-off nozzle
- Service of water in restaurants except upon request
- Using potable water for street washing
- Washing sidewalks, patios, driveways and other hardscapes unless required for public health and safety
- Recycled water must be used for construction dust control
- Irrigation is limited to the hours between 8pm to 6am

Stage 2 - All water use prohibitions established in the previous stage, plus:

- Mandatory enforcement of all items in Stage 1

Stage 3 - All water use prohibitions established in the previous stages, plus:

- Operating ornamental fountains are prohibited
- Filling new swimming pools is prohibited
- No water using landscape installation may be made in new construction
- New construction must offset new demand by conserving one times the new demand within the community

Stage 4 – All water use prohibitions established in the previous stages, plus:

- No new water using landscape installation may be made by any customer
- New construction must offset new demand by conserving two times the new demand within the community
- Filling or topping-off of existing swimming pools is prohibited

The District will fine a customer to be found in violation of one of a water use prohibition if the use continues after two District written notifications for prohibited water use. Remedies for violations of these use prohibitions are set forth in Section 4.4.

4.4 Violations of Water Use Restrictions and Repeated Excess Use

Any customer whose water use exceeds the established allotment two consecutive billing cycles, or exceeds the established allotment three billing cycles within a twelve month period, or violates one or more water use prohibitions, may, at the discretion of the District's General Manager, be subject to any of the following actions:

- At the customer's request and expense, the District will perform a complete site water audit and the customer would be required to install additional water efficient fixtures on the basis of the audit.

- At the customer's expense, the District will install a flow reducing device at the water meter
- Per the District's Water Waste Ordinance No. 1007, the District may levy a water waste fee to the customer
- Disconnection of water service and payment of the then applicable reconnection fee for reconnection of the water service

4.5 Variance Procedures

This Plan is designed to place the responsibility for managing available water resources during a water shortage emergency on the entire community. Any customer who feels his/her established allotment needs to be adjusted may apply to the District for a reassessment. Variances will be granted, on a case by case basis, at the discretion of the General Manager, and with appeal rights to the Board of Directors. The following conditions are among those that may be given consideration in the variance process:

- Water uses that support public health and safety
- Non-residential water customers (whose allotment is based on previous consumption) who can demonstrate that water efficient hardware and conservation practices were in place prior to the water shortage emergency

Section 5: Analysis of Revenue and Expenditure Impacts

5.1 Water Shortage Rate Structure

In January 2004, the District adopted a three-tiered, conservation-oriented, inclining block water rate structure for residential customers and in July 2015 based on a cost of service study the District added a 4th tier to residential rates. Water rates during a shortage condition are described in the following sections, and will be based on modifications to the tiered/flat rate structure in place at the time of the Board's determination of the existence of a water shortage.

The District's tiered water rate structure is designed to encourage efficient water use, even during normal water supply conditions. The conservation-oriented rate structure to be used during a water shortage introduces some financial risk for the District, in that some fixed costs are recovered through the commodity rate, and are based on total water usage. Currently, the District's receives 18% of its revenue from service charges and 82% from commodity rates. A reduction in water usage could result in commodity rate revenues not covering all of the District's fixed costs.

Changes to the water rate structure during each action stage of a water shortage are designed to encourage all District customers to reduce their water use in accordance with the District's water allocations and reduction goals. In addition, the rate structure changes are also necessary to help protect the financial condition of the District's water system as water demands are reduced below normal/budgeted amounts.

Two lines of action for fiscal prudence are incorporated into the District's water shortage financial strategy and rate structure.

1. To absorb the financial deficit caused by a reduction in water rate revenues (due to lower water sales) that exceeds the reduction in costs, the District's reserves will be drawn down per the Districts reserve policy currently in place at the time of the shortage..
2. During Stages 2, 3 and 4, customers will be subject to an increased commodity rate (Water Shortage Charge) to encourage water conservation by all customers and to help protect the financial condition of the District.

In FY 2014/15 when the District implemented water shortage charges it was observed that customer conserved water above and beyond the conservation target resulting in less revenue being collected from the water shortage charge than planned the District gained additional savings by purchasing less water from SCWA to be able to balance the budget. To remedy this financial problem a small Water Shortage Charge has now been added to Tier 1 water use starting in a Stage 2 shortage rather than Stage 3.

It may be noted that the Water Shortage Charge is designed such that customers meeting allocation limits during Stages 2, 3 and 4 will have lower water bills than they do with normal usage, see Section 5.2.

In Stage 1, the District's reserves will be employed to offset the loss of revenue from reduced water sales and the added costs for the water shortage response effort. Since this is a voluntary stage no changes to the water rate structure are planned during Stage 1. This however, means financial risk for the District depending on the level of conservation.

In Stages 2, 3 and 4, reduction in net revenue brought on by mandatory reductions in water sales and increased costs for the water shortage response effort will be mitigated by both the use of available reserves and the introduction of the Water Shortage Charge (WSC) on each unit of water sold. The WSC are shown in Table V.

Table V - Water Shortage Charges

	Tier 1	Tier 2	Tier 3	Tier 4	Flat Rate	Irrigation Rate
Stage 1 Voluntary: up to 25%	No WSC	No WSC	No WSC	No WSC	No WSC	No WSC
Stage 2 Mandatory: up to 25%	Current Rate + 5%	Current Rate + 10%	Current Rate + 25%	Current Rate + 50%	Current Rate + 10%	Current Rate + 50%
Stage 3 Mandatory: 26% to 35%	Current Rate + 10%	Current Rate + 25%	Current Rate + 50%	Current Rate + 75%	Current Rate + 25%	Current Rate + 75%
Stage 4 Mandatory: 36% to 50%	Current Rate + 25%	Current Rate + 50%	Current Rate + 75%	Current Rate + 100%	Current Rate + 50%	Current Rate + 100%

5.2 Projected Revenues and Expenditures

Table VI details the District's projected annual revenue and expenditure status in non-shortage conditions and at each mandatory stage in the water shortage program.

Table VI - Impact of Water Shortage on Revenues and Expenditures

	Normal Supply FY 2015/16	Stage 2: 25% Shortage	Stage 3: 35% Shortage	Stage 4: 50% Shortage
Sources of Funds				
Service Charge Revenues	880,456	880,456	880,456	880,453
Commodity Rate Revenues (1)	4,010,964	2,707,401	2,206,030	1,604,386
Water Shortage Revenues (2)	0	125,000	250,000	375,000
Excess Use Charge	0	0	50,000	50,000
Other Operating Revenues	77,000	77,000	77,000	77,000
Total Sources of Funds	4,968,420	3,789,857	3,463,486	2,986,839
Uses of Funds				
Purchased Water (3)	1,795,820	1,346,865	1,167,283	897,910
Salaries & Benefits	1,454,160	1,454,160	1,454,160	1,454,160

Operations & Maintenance	634,050	634,050	634,050	634,050
Water Shortage Prog. Exp. (4)	0	15,000	25,000	50,000
Debt Service Payment	272,377	272,377	272,377	272,377
Transfer to Capital Impr. Proj.	812,013	812,013	812,013	812,013
Total Uses of Funds	4,968,420	4,534,465	4,364,883	4,120,510
Surplus/(Deficit)	0	-744,608	-901,397	-1,133,671
Beginning Reserves (5)	1,320,000	1,320,000	1,320,000	1,320,000
Ending Reserves	1,320,000	575,392	418,603	186,329

- (1) Commodity revenues will decline disproportionate to volume of water sold due to customer reducing use from higher tiers
- (2) Water shortage charge (see Table-V) to be imposed in stages 2, 3 & 4 to limit the deficit
- (3) Purchased water costs would be reduced in proportion with water sales
- (4) Additional estimated expenditures associated with water shortage program
- (5) Emergency reserves assumed to be \$1,320,000 at start of shortage (budgeted to increase to \$2,600,000 by FY 19-20)

The financial scenarios depicted in Table VI illustrate several key points. For a single year water supply shortage the District reserves should be sufficient to make-up the revenue shortfall; however multiple years of Stage 4 would result in the entire depletion of the reserves. If this were projected to be the case the District may consider increasing the Water Shortage Charges to ensure the financial health of the District. Furthermore, a possible reduction in the transfer of funds for capital projects (which has been kept at the same level during all three shortage stages) may be considered to prevent the reserves from going below a prudent level. At the time of the actual adoption of the Water Shortage Charge, these factors may need to be kept in mind as well as the then available actual reserves.

The single family year round average water-use is 16,000 gallons per bi-monthly bill cycle meaning that in summertime the use is higher and so would the WSC's for the non-conserving customer. Table VII summarizes the water bill impacts for a typical customer that meets reduction goals under each of the three mandatory stages. Table VIII summarizes the water bill impacts for a typical customer that does not meet reduction goals under each of the three mandatory stages.

Table VII – Water Bill Impacts for Customer Meeting Reduction Goal (based on FY12/13 rates)

Demand Mgt. Stage	Reduction Goal	Bi-monthly water usage (1)	Bi-monthly Service Charge	Standard Commodity Charge	Water Shortage Charge	Total Water Bill
Normal	0%	16	\$14.64	\$70.52	\$0	\$85.16
Stage - 2	25%	12	\$14.64	\$48.24	\$2.97	\$65.85
Stage - 3	35%	10	\$14.64	\$37.10	\$3.71	\$55.45
Stage - 4	55%	7	\$14.64	\$25.97	\$6.49	\$47.10

Table VIII – Water Bill Impacts for Customer Not Meeting Reduction Goal (based on FY12/13 rates)

Demand Mgt. Stage	Reduction Goal	Bi-monthly water usage (1)	Bi-monthly Service Charge	Standard Commodity Charge	Water Shortage Charge	Total Water Bill
Normal	0%	16	\$14.84	\$70.52	\$0	\$85.36
Stage - 2	25%	16	\$14.84	\$70.52	\$5.20	\$90.56
Stage - 3	35%	16	\$14.84	\$70.52	\$12.07	\$97.43
Stage - 4	55%	16	\$14.84	\$70.52	\$25.99	\$111.35

Section 6: Implementation of the Plan

At the time that it determines the existence of a water shortage, a Water Shortage Resolution will be adopted by the District’s Board of Directors. A draft Water Shortage Resolution is provided in Appendix C.

Section 7: Monitoring Procedures

Daily/Monthly water production and delivery records will be monitored by the General Manager or the Manager’s designee. If the overall water use reduction goals adopted by the Board are not met, the General Manager will notify the Board and may recommend more aggressive measures for adoption by the Board.

Section 8: Public Noticing and Adoption

The District adopted the first Water Shortage Contingency Plan on January 21, 1992. The Plan was subsequently updated in 1996, 1998, 1999, 2005 and 2014. The 2015 updated plan was reviewed and approved at the District’s Board meeting on June 7, 2016

Valley of the Moon Water District - Water Shortage Action Plan

Stage	District Actions	Customer Actions	Comments
Stage 1 – Minimal Up to 25% Voluntary	1) Adopt resolution requesting voluntary water conservation with non-allotment based reduction goals for all user classes and prohibiting water waste and reducing all non-essential uses. 2) Initiate public information campaign: prepare and disseminate educational brochures, bill inserts, etc. Disseminate technical information to specific customer types (Irrigation and Commercial). 3) Set up public information booths urging water conservation and showing ways the public can save water. 4) Coordinate media outreach program; issue news releases to the media. 5) Explain other stages and forecast future actions. 6) Prepare for future stages: develop computer capability to initiate rationing stages. 7) Gather census information from residential sector for per capita allotments	1) Implement voluntary water use reductions by eliminating waste and non-essential uses. 2) Adhere to water shortage resolution. 3) Become aware of possible further restriction.	1) Voluntary program with community-wide goals. 2) Strong public information campaign. 3) Emphasis on elimination of waste and increased awareness. 4) Hose-end shut-off nozzles are required on all garden and utility hoses. 5) Hosing off hard surfaces is prohibited except for health and safety reasons. 6) Water-on-request@ restaurant program. 7) Use of potable water prohibited for street washing.

Appendix 1

Stage	District Actions	Customer Actions	Comments
Stage 2 – Moderate Up to 25% Mandatory	In addition to Stage 1: 1) Adopt rationing ordinance: assigning allotment to each water service: -Residential based on per capita plus landscape allotment; -Irrigation only based on ETo water budget; -Non-residential based on reduction from previous consumption. 2) Adopt resolution to implement Water Shortage Charge (WSC) 3) Implement Stage 2 WSC's 4) Increase District support: add temporary position to staff phone lines, perform patrol for water waste violations and customer audits. 5) Enforce irrigation hour limitations 6) Develop penalty structure/fee for water waste violations. 7) Increase public info campaign. 8) Notify each service of allotment goals.	1) Adhere to allotment for up to 25 percent overall reduction. 2) Request variance where required. 3) Eliminate all prohibited uses. 4) Limit irrigation to 3 days per week	1) Mandatory program with allotments for each service; residential with moderate landscape allotments. 2) Close tracking and feedback to community regarding goals and achieved savings. 3) Irrigation limited to the hours between 8pm to 6am.

Appendix 1

Stage	District Actions	Customer Actions	Comments
Stage 3 – Severe 26% to 35% Mandatory	In addition to Stage 2: 1) Intensify ordinance requirements: -Prohibit new installation of landscaping in new construction. -Require new construction to offset one times the new demand through upgrades to existing homes and businesses (toilet replacements, etc.). 2) Implement Stage 3 WSC's 3) Intensify public information campaign. 4) Promote participation in new construction offset program 5) Expand Shortage Response and patrol/audit effort.	1) Adhere to allotment for up to 35 percent overall reduction. 2) Request variance where required. 3) Eliminate all prohibited uses.	1) Mandatory program with allotments for each service; residential with minimal landscape allotments. 2) Close tracking and feedback to community regarding goals and achieved savings. 3) Operation of ornamental fountains is prohibited. 4) Ban on filling new pools. 5) No landscape installations in new construction. 6) New construction must offset demand within the community.

Appendix 1

Stage	District Actions	Customer Actions	Comments
Stage 4 – Critical 36% to 50% Mandatory	In addition to Stage 3: 1) Intensify ordinance requirements: -Prohibit installation or replanting of any landscaping. -Require new construction to offset two times the new demand through upgrades to existing homes and businesses (toilet replacements, etc.). 2) Implement Stage 4 WSC's 3) No new/rehabilitation of landscaping by any customer 4) Intensify public information campaign. 5) Promote participation in new construction offset program 6) Expand Shortage Response and patrol/audit effort.	1) Adhere to allotment for 50 percent overall reduction: 2) Request variance where required. 3) Eliminate all prohibited uses.	1) Mandatory program with allotments for each service; residential with zero landscape allotments. 2) Close tracking and feedback to community regarding goals and achieved savings. 3) No new landscape installation for all customers. 4) New construction must offset demand by two times within the community 5) Filling/topping all swimming pools is prohibited.

DRAFT

RESOLUTION OF THE VALLEY OF THE MOON WATER DISTRICT
DECLARING A WATER SHORTAGE AND ACTION STAGE, AND ESTABLISHING AN
OVERALL WATER DEMAND REDUCTION GOAL

WHEREAS, the Valley of the Moon Water District is a County Water District, duly organized and existing under the provisions of the County Water District Law (California Water Code section 30000 *et seq.*), and is empowered to provide water service to customers within certain boundaries; and

WHEREAS, due to current water supply conditions, the Sonoma County Water Agency (Agency) has reduced water delivery to the District and to all prime contractors which purchase water from the Agency by ____%; and

WHEREAS, due to (describe current water supply conditions – reduced deliveries, drought, contamination, etc.), the reduced water supply estimated to be available to the District from the Agency, together with the supply of water from other sources available to the District, will not be sufficient to meet the District’s customers’ normal water needs during (describe the time period); and

WHEREAS, the water conditions described above indicate that a ____% reduction in demand is required to ensure that the District will have an adequate supply of water to meet its customers’ water needs during (describe the time period); and

WHEREAS, pursuant to the provisions of Water Code section 375 *et seq.* and 10632, the District has the authority and responsibility to adopt water demand reduction measures within its area of service during the existence of a water shortage, and the Board of Directors has conducted a duly noticed public hearing on this ____ day of ____, 2____, has heard a report from its General Manager on the reduced current water supply conditions and on the need for demand reduction during this time of reduced available supplies, and has provided an opportunity for the public to be heard on these matters.

NOW, THEREFORE, IT IS RESOLVED that the Board of Directors finds and determines that under the current conditions a water shortage exists within the area served by the District’s water system, and that the water supplies available to the District are insufficient to serve the normal water demands of the District’s customers.

BE IT FURTHER RESOLVED, that the Board of Directors declares that a water shortage exists, further declares that the water shortage condition has reached Action Stage _ and hereby establishes an Overall Demand Reduction Goal of __%, as defined in the District’s Urban Water Shortage Contingency Plan, as the necessary and appropriate water conservation program in order to reduce the quantity of water used by the District’s customers during the water shortage.

BE IT FURTHER RESOLVED, that the Board of Directors finds and determines that the water shortage declaration and the water conservation program provided for herein are in the public interest, serve a public purpose, and will promote the health, welfare, and safety of the people who reside within the District.

BE IT FURTHER RESOLVED, that this resolution shall become effective immediately upon its adoption, that the General Manager is hereby directed to provide for its publication in full within 10 days in a newspaper of general circulation within the District, and for its posting in at least 3 public places within the District.

BE IT FURTHER RESOLVED, that the General Manager is hereby authorized and directed to take such steps as he shall deem necessary to implement the Overall Demand Reduction Program, shall report back to this Board on the status of the water supply and the results of the Demand Reduction Program, and shall make such recommendations for further actions of this Board as may be necessary and appropriate during the existence of the water shortage.

THIS RESOLUTION PASSED AND ADOPTED THIS ____DAY OF _____ 20

_____, by the following votes:

Director _____

By _____

Director _____

President

Director _____

By _____

Deputy Secretary

Director _____

Director _____

AYES _____ NOES _____ ABSENT _____ ABSTAIN _____

I HEREBY CERTIFY that the foregoing Resolution was duly adopted at a regular meeting of the Board of Directors of Valley of the Moon Water District held on the _____ day of _____, 20____, of which meeting all Directors were notified and at which meeting a quorum was present at all times and acting.

By _____

Deputy Secretary

California Water Code Section 10632
Urban Water Management Planning
Shortage Contingency Analysis

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:

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



**APPENDIX H:
DRAFT RESOLUTION ADOPTING STAGE OF WSCP**

DRAFT

RESOLUTION OF THE VALLEY OF THE MOON WATER DISTRICT
DECLARING A WATER SHORTAGE AND ACTION STAGE, AND ESTABLISHING AN
OVERALL WATER DEMAND REDUCTION GOAL

WHEREAS, the Valley of the Moon Water District is a County Water District, duly organized and existing under the provisions of the County Water District Law (California Water Code section 30000 *et seq.*), and is empowered to provide water service to customers within certain boundaries; and

WHEREAS, due to current water supply conditions, the Sonoma County Water Agency (Agency) has reduced water delivery to the District and to all prime contractors which purchase water from the Agency by ____%; and

WHEREAS, due to (describe current water supply conditions – reduced deliveries, drought, contamination, etc.), the reduced water supply estimated to be available to the District from the Agency, together with the supply of water from other sources available to the District, will not be sufficient to meet the District's customers' normal water needs during (describe the time period); and

WHEREAS, the water conditions described above indicate that a ____% reduction in demand is required to ensure that the District will have an adequate supply of water to meet its customers' water needs during (describe the time period); and

WHEREAS, pursuant to the provisions of Water Code section 375 *et seq.* and 10632, the District has the authority and responsibility to adopt water demand reduction measures within its area of service during the existence of a water shortage, and the Board of Directors has conducted a duly noticed public hearing on this ____ day of ____, 2____, has heard a report from its General Manager on the reduced current water supply conditions and on the need for demand reduction during this time of reduced available supplies, and has provided an opportunity for the public to be heard on these matters.

NOW, THEREFORE, IT IS RESOLVED that the Board of Directors finds and determines that under the current conditions a water shortage exists within the area served by the District's water system, and that the water supplies available to the District are insufficient to serve the normal water demands of the District's customers.

BE IT FURTHER RESOLVED, that the Board of Directors declares that a water shortage exists, further declares that the water shortage condition has reached Action Stage _ and hereby establishes an Overall Demand Reduction Goal of __%, as defined in the District's Urban Water Shortage Contingency Plan, as the necessary and appropriate water conservation program in order to reduce the quantity of water used by the District's customers during the water shortage.

BE IT FURTHER RESOLVED, that the Board of Directors finds and determines that the water shortage declaration and the water conservation program provided for herein are in the public interest, serve a public purpose, and will promote the health, welfare, and safety of the people who reside within the District.

BE IT FURTHER RESOLVED, that this resolution shall become effective immediately upon its adoption, that the General Manager is hereby directed to provide for its publication in full within 10 days in a newspaper of general circulation within the District, and for its posting in at least 3 public places within the District.

BE IT FURTHER RESOLVED, that the General Manager is hereby authorized and directed to take such steps as he shall deem necessary to implement the Overall Demand Reduction Program, shall report back to this Board on the status of the water supply and the results of the Demand Reduction Program, and shall make such recommendations for further actions of this Board as may be necessary and appropriate during the existence of the water shortage.

THIS RESOLUTION PASSED AND ADOPTED THIS ____DAY OF _____ 20____, by the following votes:

Director _____	_____	By _____
Director _____	_____	President
Director _____	_____	By _____
Director _____	_____	Deputy Secretary
Director _____	_____	
AYES _____	NOES _____	ABSENT _____ ABSTAIN _____

I HEREBY CERTIFY that the foregoing Resolution was duly adopted at a regular meeting of the Board of Directors of Valley of the Moon Water District held on the _____ day of _____, 20____, of which meeting all Directors were notified and at which meeting a quorum was present at all times and acting.

By _____
Deputy Secretary



**APPENDIX I:
SMSWP ANNUAL REPORT 2014-2015**



ANNUAL REPORT
FISCAL YEAR 2014-2015

SONOMA - MARIN
SAVING WATER
PARTNERSHIP

About the Partnership

The Sonoma-Marín Saving Water Partnership (Partnership) represents 10 water utilities in Sonoma and Marin counties that have joined together to provide regional solutions for water use efficiency.

The utilities include the Cities of Santa Rosa, Rohnert Park, Petaluma, Sonoma, Cotati; North Marin, Valley of the Moon and Marin Municipal Water Districts; Town of Windsor and Sonoma County Water Agency (Partners). Each of the Partners have water conservation programs that can assist customers in reducing their water use.

The Partnership was formed to identify and recommend implementation of water use efficiency projects, and maximize the cost-effectiveness of water use efficiency programs in our region.

The Partners are committed to remain members in good standing of the California Urban Water Conservation Council (CUWCC) and implement the Best Management Practices (BMPs) for water conservation.



There's Never Enough to Waste! Turn the Water Off!

This year the California Drought continued for a fourth consecutive year and Governor Jerry Brown directed the State Water Resources Control Board to mandate outdoor water use restrictions and reduce overall water use in California from June 2015 through February 2016 by 25% compared to the same period in 2013. Even though our region experienced more rainfall than the prior year the Sonoma Marin Water Saving Partnership continued its' collaborative water use efficiency public outreach effort with a simple message: "There's Never Enough to Waste! Turn the Water Off!" Radio, television, print and online media urged water users to conserve. The area retail water providers stepped up their water conservation efforts with additional Drought Drive-Ups, Do-It-Yourself campaigns, recycled water residential fill stations and cooperation with local businesses.

For the third year in a row the Partnership received an award from the U.S. Environmental Protection Agency (EPA). The 2015 WaterSense "Partner of the Year" recognition as a professional certifying organization for promoting water efficient irrigation practices through implementation of the Qualified Water Efficient Landscaper Program (QWEL) was presented to the Partnership at the WaterSmart Innovations Conference. QWEL educates landscape professionals and their customers on the benefits of sound landscape design, management and irrigation practices. The award was one of only seven issued by the EPA nationally.

The Partnership was formed in late 2010 and recognizes that establishing common regional water conservation projects may cost effectively conserve more water than would otherwise be conserved by individual agencies. This regional approach is based on meeting water conservation regulatory requirements by offering financial incentives to conserve and by educating water users about where their drinking water comes from and how to use it most efficiently. The Partnership, through its many water efficiency programs, educational seminars and outreach campaigns, is working every day of the year to educate our communities about the importance of conserving water resources and curbing water-wasting behaviors.

Regional water use during Fiscal Year 2014/15 remains to be significantly from prior years as mandatory outdoor water use restrictions continue in effect. The Partnership offers educational resources, programs and incentives to aid our communities in meeting water use efficiency requirements in the future as we work together in response to variable water year conditions and maintain supplies for beneficial use and instream needs.

Sincerely,

Dennis Rodoni, Chair
Water Advisory Committee

David Rabbitt, Chair
Sonoma County Water Agency

Our Service Area

More than 600,000 residents in Sonoma and Marin counties rely on the water delivered from the Russian River by the Sonoma County Water Agency (Water Agency) to the nine cities and districts in the Partnership. Supplementing the water provided by the Water Agency are local supplies including recycled water, groundwater from underground aquifers and surface water reservoirs.

Recreation, agriculture and wildlife, including threatened and endangered steelhead, coho and Chinook salmon also rely on these same natural resources in order to thrive.

Realizing the importance of protecting and preserving water resources for future generations, the members of the Partnership have taken a proactive role in helping fund, maintain and implement an array of water supply, water use efficiency and fishery recovery programs.



Partnership Achievements by the Numbers

Fiscal Year 2014/2015



ANNUAL MULTI-MEDIA PUBLIC EDUCATION CAMPAIGN

Building on the success of the 2014 “There’s a drought on. Turn the water off” campaign, the Partnership continued “The official...” theme with a new message, “There’s never enough to waste. Turn the water off.” The response to the campaigns have been overwhelmingly positive as the region entered the fourth year of drought.

The Partnership also held four “Drought Drive-Up” events to distribute drought tool kits in partnership with local businesses to promote water use efficiency. The kits included buckets for collecting and reusing bath and shower water, high-efficiency shower heads and faucet aerators, and dye tablets to test toilets for leaks. A total of 2,500 kits were distributed.



PROGRAM EXPENDITURES

Program Expenditures (in thousands of dollars)											
	City of Cotati	Marin Municipal Water District	North Marin Water District	City of Petaluma	City of Rohnert Park	City of Santa Rosa	City of Sonoma	Valley of the Moon Water District	Town of Windsor	Sonoma County Water Agency	Regional Total
FY 14-15	\$20	\$1,175	\$461	\$576	\$16	\$1,294	\$116	\$366	\$411	\$2,020	\$6,440
Minimum	\$18	\$206	\$217	\$260	\$102	\$555	\$59	\$70	\$13	NA	\$1,500

Minimum is established in the MOU regarding the Sonoma-Marin Saving Water Partnership.

2015 TEMPORARY URGENCY CHANGE PETITION and GOVENOR’S DECLARATION

On April 1, 2015, Governor Brown issued the fourth in a series of Executive Orders on actions necessary to address California’s severe drought conditions, which directed the State Water Resources Control Board to implement mandatory water reductions in urban areas to reduce potable urban water usage by 25 percent statewide. On May 5, 2015, the State Water Board adopted an emergency conservation regulation in accordance with the Governor’s directive. The provisions of the emergency regulation went into effect on May 18, 2015.

On May 1, 2015, the amount of water released from Lake Mendocino into the Russian River was reduced in order to preserve water supplies during the ongoing drought. The State Water Resources Control Board issued a Temporary Urgency Change Order allowing the Sonoma County Water Agency to reduce Russian River flows starting May 1 through October 27, 2015. This action, along with the reduction in demands due to the Governor’s mandate, has ensured local water supplies have been adequate.

Partnership Highlights

BARNACLE PILOT PROGRAM

Sonoma County Water Agency launched a 12 month pilot program in November 2014 to track hourly water use at 69 single family, industrial, institutional and commercial facilities in Windsor, Santa Rosa, Petaluma, Sonoma and Novato. The Barnacle records water use hourly and uploads the information via cellular technology to a user-friendly website for the customer and the Water Agency to monitor. Through this program, several large leaks were detected and fixed. In a post-program study, 62% of applicants said that the Barnacle helped them save water.

PLANT SALE

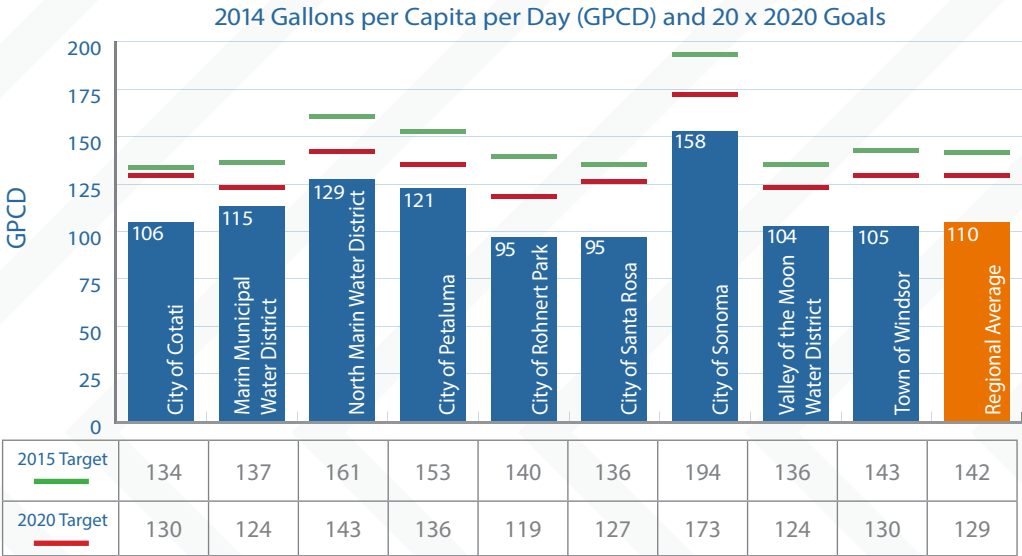
On May 30, 2015, The Home Depot in Santa Rosa and the Partnership hosted the Plant Sale and Water Smart Fair. The Sale included exhibitors such as the Master Gardeners, who offered advice to shoppers about low water use plants, and the City of Santa Rosa which outfitted their booth with a working replica of a rainwater harvesting system. There were also demonstrations of sheet mulching, information about compost, irrigation conversion and graywater systems. Low water use plant varieties were put on sale specifically for this event to encourage customers to purchase these plants. Kids activities were hosted throughout the 4 hour event including planting succulents and painting a small bug box.

20 x 2020 GOALS

In 2009, SBx7-7 established a statewide goal, known as 20 x 2020, to reduce per capita water use 20% by the year 2020 with an interim goal of a 10% reduction by 2015. The chart below displays 2014 per capita water use in each Partner service area and the region as a whole. The 2015 and 2020 goals are indicated by the green and red lines, respectively.

While the chart shows that all of the Partners are currently meeting their 2020 targets, we recognize that water use efficiency must continue. Many factors can affect water use patterns as seen in recent years. The rebound in the economy is one key factor that has caused an increase in water use. The overall longterm trend shows water demands have dropped as a result of many factors including the California drought, economy, changes in weather conditions, and active water use efficiency programs.

It is important to continue the work on water use efficiency to maintain the savings already achieved and make sure the region captures all the benefits of future water savings.



CAR WASH PROGRAM LAUNCH

The Sonoma County Green Business Program, which has certified 148 local businesses who have volunteered to operate in a more environmentally responsible way, has launched a new certification for car washes. The criteria was developed to prompt a reduction in water, energy use, waste and chemicals. The car wash criteria complies with specific gallon per minute standards on wash nozzles, education to customers about how to save water and leak detection practices. This new certification is especially critical because of California’s ongoing drought conditions as well as increased efforts to protect local waterways. For a list of certified car washes in Sonoma County, visit www.savingwaterpartnership.org/carwash



EPA PARTNER OF THE YEAR AWARD

The Partnership was recognized with a 2014 WaterSense Partner of the Year Award from the U.S. Environmental Protection Agency (EPA) for its work in educating landscape professionals through its WaterSense labeled Qualified Water Efficient Landscaper (QWEL) professional certification program in irrigation system auditing.

The QWEL professional certification program presents an affordable proactive local approach to reducing landscape water demand. QWEL provides graduates with knowledge in water efficient and sustainable landscape practices including water management and preservation of other valuable resources. QWEL has issued over 1200 certifications to date and is offered by 12 organizations throughout the U.S. In 2014, 200 landscape professionals became QWEL certified.

SONOMA - MARIN
SAVING WATER
PARTNERSHIP



City of Cotati
(707) 665-3631
www.ci.cotati.ca.us



**MARIN MUNICIPAL
WATER DISTRICT**
Marin Municipal Water District
(415) 945-1520
www.marinwater.org



City of Petaluma
(707) 778-4507
cityofpetaluma.net/wrcd



**NORTH MARIN
WATER DISTRICT**

North Marin Water District
(415) 761-8933
www.nmwd.com



City of Rohnert Park
(707) 588-3300
www.rpcity.org



Sonoma County Water Agency
(707) 547-1933
sonomacountywater.org

 **City of
Santa Rosa**
Utilities Department

City of Santa Rosa
(707) 543-3985
www.srcity.org/wue



Town of Windsor
(707) 838-1004
townofwindsor.com



City of Sonoma
(707) 933-2237
www.sonomacity.org



Valley of the Moon Water District
(707) 996-1037
www.vomwd.com

www.savingwaterpartnership.org


EPA **WaterSense**
PARTNER



**APPENDIX J:
WATER WASTE PROHIBITION – ORDINANCE NO. 1007**

ORDINANCE NO. 1007

AN ORDINANCE OF THE VALLEY OF THE MOON WATER DISTRICT INSTITUTING WATER WASTE PROHIBITIONS

SECTION 1. The Valley of the Moon Water District does hereby ordains as follows:

The Regulations of the Valley of the Moon Water District hereby amended by adding Section 12 to read as follows:

“Section 12 - Water Waste Prohibitions

A. Purpose. The purpose of this Section is to promote water conservation and the efficient use of potable water furnished by the Valley of the Moon Water District by eliminating intentional or unintentional water waste when a reasonable alternative solution is available, and by prohibiting use of equipment which is wasteful.

B. Nonessential Uses. No customer of the Valley of the Moon Water District shall use or permit the use of potable water from the Valley of the Moon Water District for residential, commercial, institutional, industrial, agricultural, or other purpose for the following nonessential uses:

1. The washing of sidewalks, walkways, driveways, parking lots and other hard-surfaced areas by direct hosing, except as may be necessary to properly dispose of flammable or other dangerous liquids or substances, wash away spills that present a trip and fall hazard, or to prevent or eliminate materials dangerous to the public health and safety;
2. The escape of water through breaks or leaks within the customer’s plumbing or private distribution system for any substantial period of time within which such break or leak should reasonably have been discovered and corrected. It shall be presumed that a period of seventy-two (72) hours after the customer discovers such a break or leak or receives notice from the Valley of the Moon Water District, is a reasonable time within which to correct such break or leak or, at a minimum, to stop the flow of water from such break or leak;
3. Irrigation in a manner or to an extent which allows excessive run off of water or unreasonable over-spray of the areas being watered. Every customer is deemed to have his water system under control at all times, to know the manner and extent of his water use and any run off, and to employ available alternatives to apply irrigation water in a reasonably efficient manner;
4. Washing cars, boats, trailers or other vehicles and machinery directly with a hose not equipped with a shutoff nozzle;

5. Water for non-recycling decorative water fountains;
6. Water for single pass evaporative cooling systems for air conditioning in all connections installed after June 6, 2000 unless required for health or safety reasons;
7. Water for new non-recirculating conveyor car wash systems; and
8. Water for new non-recirculating industrial clothes wash systems.

C. Exempt Water Uses. All water use associated with the operation and maintenance of fire suppression equipment or employed by the Valley of the Moon Water District for water quality flushing and sanitation purposes shall be exempt from the provisions of this section. Use of water supplied by a private well or from a reclaimed wastewater, gray water or rainwater utilization system is also exempt.

D. Variances. Any customer of the Valley of the Moon Water District may make written application for a variance. Said application shall describe in detail why applicant believes a variance is justified.

1. The General Manager of the District may grant variances for use of water otherwise prohibited by this section upon finding and determining that failure to do so would cause an emergency condition affecting the health, sanitation, fire protection or safety of the applicant or public; or, cause an unnecessary and undue hardship on applicant or public, including but not limited to, adverse economic impacts, such as loss of production or jobs.
2. The decision of the General Manager of the District may be appealed to the Board of Directors by submitting a written appeal to the District within fifteen (15) calendar days of the date of the decision. Upon granting any appeal, the Board of Directors may impose any conditions it determines to be just and proper. Variances granted by the Board of Directors shall be prepared in writing and the Board of Directors may require the variance be recorded at applicant's expense.

E. Enforcement and Fees. Depending on the extent of the water waste the District may, after written notification to customer and a reasonable time to correct the violation as solely determined by the District, take some or all of the following actions. Penalties, fees and charges noted below shall be established by resolution of the District. The penalties listed in Sections E3, E4 and E5 below will be applied only in acute emergencies as determined and publicly announced by the General Manager, or after the Board has declared a Stage 2 or equivalent water shortage condition.

1. Written notice to the customer of the water waste violation including a specified period of time to correct the violation.
2. Personal contact with the customer at the address of the water service. If personal contact is unsuccessful, written notice of the violation including a date that the violation is to be corrected may be left on the premises, with a copy of the notice sent by certified mail to the customer.
3. The District may install a flow-restricting device on the service line.
4. The District may levy a water waste fee to the customer.
5. The District may cause termination of water service and the charge for same shall be billed to the customer. Except in cases of extreme emergency as solely determined by the General Manager of the District, service shall not be reinstated until verified by the District that the violation has been corrected and all charges and fees have been paid.

SECTION II. SEVERABILITY

If any section, subsection, sentence, clause, phrase, or word of this ordinance is for any reason held to be invalid, the validity of the remaining portion of this ordinance shall not be affected.

SECTION III. FINDINGS

A. This Ordinance is enacted in accordance with California Water Code section 375, *et seq.* and for the purpose of insuring that all water furnished by the District is put to reasonable beneficial use, to prevent the waste of water, and to promote efficient use and conservation of water.

B. The District determines that this ordinance is a Class 7 categorical exemption under section 15307 of the California Environmental Quality Act, which exempts actions by regulatory agencies for protection of natural resources.

SECTION IV. EFFECTIVE DATE

This ordinance shall become effective upon its adoption.

SECTION V. PUBLICATION

Within ten (10) days after its adoption, this resolution shall be published pursuant to Section 6061 of the Government Code in full in a newspaper of general circulation that is printed, published, and circulated in the District. If there is no such newspaper the resolution shall be posted within ten (10) days after its adoption in three public places within the District.

On the Motion of Director Whinery and second by Director Kenny, the Ordinance was PASSED, APPROVED AND ADOPTED this 6th day of June, 2000, by vote as follows:

President Willer	<u>Aye</u>	Director Sutsos	<u>Aye</u>
Vice President Whinery	<u>Aye</u>	Director Kenny	<u>Aye</u>
Director Pedroncelli	<u>Aye</u>		

AYES: 5 NOES: 0 ABSTAIN: 0 ABSENT 0

BY: SIGNED
David Willer, President of the Board

I HEREBY CERTIFY that the foregoing Resolution was duly adopted at a regular meeting of the Board of Directors of the Valley of the Moon Water District, held on the 6th day of June, 2000, of which meeting all Directors were duly notified and at which meeting a quorum was present at all times and acting.

By: SIGNED
Judith Ponts, Board Secretary

Approved: SIGNED
Attorney

User/Ordinances/ord1007



**APPENDIX K:
BOARD RESOLUTION ADOPTING THE 2015 UWMP**

**RESOLUTION OF THE BOARD OF DIRECTORS OF THE VALLEY OF THE MOON
WATER DISTRICT ADOPTING THE 2015 URBAN WATER MANAGEMENT PLAN
AND AUTHORIZING STAFF TO SUBMIT THE PLAN TO DWR**

WHEREAS, the Urban Water Management Planning Act, California Water Code Section 10610 *et seq.*, requires that every urban water supplier directly or indirectly supplying water for municipal purposes to more than 3,000 customers prepare an Urban Water Management Plan (UWMP), the primary objective of which is to plan for the conservation and efficient use of water while balancing supply and demand; and

WHEREAS, the District staff, with the assistance of consultants Maddaus Water Management and Erler & Kalinowski, Inc., has prepared the 2015 UWMP for the District to meet the requirements of Urban Water Management Planning Act, in accordance with guidelines developed by the California Department of Water Resources; and

WHEREAS, District staff and consultants who prepared the 2015 UWMP have the training, experience, and expertise necessary to prepare a plan meeting the requirements of the Urban Water Management Planning Act; and

WHEREAS, the 2015 UWMP includes the District's SB x7-7 interim 2015 community water use target at 133 gpcd and final 2020 community water use target at 124 gpcd and projects that the District will be in compliance with the community water use targets; and

WHEREAS, the 2015 UWMP must be adopted after public review and a public hearing by the District's Board of Directors and must be filed with the Department of Water Resources; and

WHEREAS, the District, in compliance with the legislative requirements, prepared the 2015 UWMP, and commencing on May 24, 2016 made those documents available for public review; and

WHEREAS, the District, on June 7, 2016, held a duly noticed public hearing before this Board and received comments; and

WHEREAS, District staff, consultants, and the Board have reviewed and considered the comments made on the 2015 UWMP, and the Board has reviewed and considered the final 2015 UWMP, the District's staff reports, and the presentations by District staff and consultants; and

WHEREAS, the 2015 UWMP was prepared in accordance with, and meets the requirements of, the Urban Water Management Planning Act, and the facts, assumptions, and analyses in the 2015 UWMP are reasonable and supported by substantial evidence;

NOW, THEREFORE, BE IT RESOLVED that the Board of Directors of the Valley of the Moon Water District hereby finds, determines, and declares as follows:

1. The 2015 Urban Water Management Plan is hereby approved and adopted.

2. The General Manager is authorized and directed to provide a copy of 2015 UWMP to the Department of Water Resources and otherwise as required by Water Code section 10644(a).

THIS RESOLUTION PASSED AND ADOPTED THIS 7th DAY OF JUNE, 2016, by the following votes:

Director Foreman Y

Director Prushko A

Director Adams Y

Director Heneveld Y

Director Kenny Y

AYES (4)

NOES 0

ABSENT 1

ABSTAIN 0

By [Signature]
President

By [Signature]
Deputy Secretary

I HEREBY CERTIFY that the foregoing Resolution was duly adopted at a regular meeting of the board of Directors of Valley of the Moon Water District, held on the 7th day of June, 2016, of which meeting all Directors were duly notified and at which meeting a quorum was present at all times and acting.

By [Signature]
Deputy Secretary



**APPENDIX L:
PLAN SUBMITTAL DOCUMENTATION**